ΓΕΩΠΟΝΙΚΑ.

AGRICULTURAL PURSUITS.

TRANSLATED FROM THE GREEK,

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VOL. I.

Τουτου χαριν αυτα συνεγραψα, ινα μη δοξω τι παραλιμπανειν των τοις Αρχαιοις ειρημενων. ΓΕΩΠ. Lib. i. c. 14.

I have written these things for this reason, that I may not seem to omit any of the things related by the Ancients.

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AUTHORS

OF THE

GEOPONIKA.

JULIUS AFRICANUS, a christian, flourished under Alexander Severus. He was the first of the christians who wrote on chronology, of which Eusebius has left us some fragments. He wrote nine books, under the title of Κεστοι, in which he treats of medical, physical, and chemical subjects. Eusebius, lib. vi. c. 31, says that one of his epistles written to Origen is extant.

ANATOLIUS is said to have been the preceptor of the Emperor Theodosius.—*Suidas.*

APSYRTUS, the veterinary practitioner, a native of Prusa[a] in Bithynia, served under the Emperor Constantine in the Scythian war.—*Suidas.*

APULEIUS. There were two persons of this name; one called Lucius Apuleius, born at Madaura, a city of Africa, who

[a] A city to the south of the river Ascanius.

lived in the reign of Antoninus Pius; the other was Apuleius Celsus, a celebrated physician, who is said to have lived under Augustus or Tiberius. Which of these is cited in this work, has been a subject of dispute among the learned.

Aratus, of Soll in Cilicia, lived in the reign of Antigonus Gonatus, about the 124th Olympiad.—*Suidas.*

Berytius. It has been imagined that Hermippus Berytius, the disciple of Philo Biblius, who lived in the reign of Adrian, is here meant. Suidas also makes mention of Taurus Berytius, a Platonic philosopher, in the time of Antoninus Pius; and of Lupercus Berytius, who lived a short time before the reign of Claudius. Some have supposed that the epithet belongs to Anatolius.

Cassianus is said to have made this collection.

Damogeron is mentioned by Apuleius, *Apolog.* p. 544. Some of his agricultural precepts are cited by Palladius, ii. xv. xvi. 11, 12. 3.

Democritus was called the Abderite, from his native place. He lived about the 80th Olympiad. He wrote on agri-

culture.

culture. *Columella*, c. 1. et lib. xi. c. 3. He is quoted by Palladius and Varro. He is said to have been cotemporary with Socrates and Hippocrates.

Didymus the Alexandrian wrote fifteen books on agriculture.

Cassius Dionysius, of Utica, according to Varro, translated the books of Mago on agriculture; lib. i. 1. 10.

Diophanes, the Bithynian, born at Nice[b], cotemporary with Cæsar and Cicero, reduced C. Dionysius of Utica into six books. Asinius Pollio Trallianus afterwards abridged Diophanes.

Florentinus wrote commentaries on agriculture, which Photius mentions in *Myriobib. Tmem.* clxiii. He lived under the Emperor Macrinus, about the 218th year of the christian æra.

Fronto, the rhetorician, lived at Rome under Alexander Severus. He taught at Athens in opposition to Philostratus and Gadarenus; and died there, being nearly sixty years old.—*Suidas.*

Hierocles wrote two books concerning veterinary practice, and dedicated them to

 C. Bas-

[b] A city to the north of the Lake Ascanius in Bithynia.

C. Bassus.—*Pearsonus Episcop. Cestriencis in Proleg. in Hieroclis lib. de Providentia et Fato.*

Hippocrates, the physician of Coos, is said to have been born in the 80th Olympiad. He flourished under Artaxerxes Longimanus, whose epistle to the prefect of the Hellespont, in which he orders Hippocrates to be sent to him, is mentioned by Soranus in the Life of Hippocrates, and it may be read in Suidas. Hippocrates, a veterinary writer, is respectfully mentioned by Salmasius, in lib. *de Homonymis Hyles*, cap. 58 et 59.

Juba was the son of Juba, king of Mauritania, who was taken a youth and led in triumph by Julius Cæsar, who took care that he should be taught the liberal arts. Plutarch, in the Life of Cæsar, says that his captivity was no disadvantage to him, in these words: "Then Juba his son, "being quite young, was led in triumph. "His captivity was fortunate to him, "who from the barbarous Numidians "is reckoned among the most learned "writers of the Greeks."

Leontinus, or Leontius, is by Photius called Λεων. He is perhaps the same

as

as Leontius Scholasticus, whose epigrams are to be found in the 4th book of the *Anthologia.*

Nestor, a poet, of Laranda in Lycia, flourished under Alexander Severus; and he wrote the Iliad λειπογραμματον and some other things. Suidas has left us this account of him: "Nestor of Laranda in "Lycia, an epic poet, father of Pisander "the poet, lived under Alexander Severus. "He wrote an Iliad, wanting some books. "Tryphiodorus wrote an Odyssey in the "same way. For in the first book, which "is inscribed A, the letter[e] is not found; "and so in other books, that letter, which "points out the number of the book, is "wanting. He also wrote Metamorphoses."

Oppianus, a Cilician, was a grammarian and poet. He lived under Antoninus Caracalla.

Pamphilus, an Alexandrian grammarian, a disciple of Aristarchus, flourished two centuries before Christ. See *Galeni Opera, Basileæ,* 1538.

Paxamus wrote concerning the culinary art, in an alphabetical order: two books,

[e] The author means the book is deficient.

entitled *Boiotica;* a treatise, called *Dodecatechnon;* two books, on[d] the art of dying; some books on agriculture.—*Julius Pollux*, lib. vi. c. 10. *Athenæus*, lib. ix. p. 376. *Columella*, lib. xii. c. 4.

Pelagonius, a writer, whom chronology has not fixed to any particular period of time, is often mentioned by Vegetius.

Philostratus, the son of Philostratus a Lemnian sophist (who was said to be the son of Verus), was a sophist, who taught first at Athens, then at Rome, under the Emperor Severus. He wrote the life of Apollonius Tyanensis, in eight books.—*Suidas.*

Ptolemæus of Alexandria, a philosopher, lived in the time of the Emperor Marcus. He wrote three books, entitled *Mechanaci*, and several other learned works.—*Suidas.*

The Quintilii, Gordianus, and Maximus, who were brothers, lived about the time of the Emperor Commodus, by whom they are said to have been put to death, as it is recorded by Xiphilinus, in Dio Cassius, page 819.

Sotion

[d] *De arte tinctoria.*

Sotion is said to have been a philosopher; *Diogenes Laërtius*, lib. x. segm. 4. He wrote concerning rivers, fountains, and lakes; *Photius Tmem.* clxxxix. Vossius says, he lived in the time of Tiberius; *Plutarchi Alexand.* p. 699.

Tarentinus. There were two persons of this name, one called Archytas Tarentinus, mentioned by Varro and Columella; the other was Heraclides Tarentinus, a medical practitioner, a disciple of Herophilus, who is said to have been the first who used compound medicines, and who treated of the doctrine of pulses with any accuracy. Galen makes mention of him; and he seems to think him superior to Antonius Musa, who was physician to Augustus; and he takes notice of his going over to the empiric sect. He is mentioned by C. Celsus among medical practitioners, and by Epiphanius and Dioscorides among botanical writers. He is also mentioned by Hierocles in his Procœmium to the Hippiatrica.

Theomnestus is said to have been a veterinary writer.

M. Terentius Varro was a Roman of the greatest learning, whose three books

on

on agriculture, and whose treatise concerning the Latin tongue, have descended to us.

Vindanionius is by Photius called Vindanius, an agricultural writer, concerning whom the learned have transmitted to us little more than his name, and such things as are ascribed to him in the following publications.

Zoroastres, the Persian, was a learned astronomer, who was the first of the sect called *Magi*. He lived long before the Trojan war. There are four of his books entitled *De Naturâ*; there is one concerning precious stones; his predictions from astronomical observations; his five books called Apotelesmatica.— *Suidas*. It is doubted whether this is the person mentioned in the following work.

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ΓΕΩΠΟΝΙΚΑ.

AGRICULTURAL PURSUITS.

PROEM.

THIS* great city has indeed been distinguished by many other useful sovereigns, and it has cherished in its bosom their exploits and virtues as certain treasures of great value; but it will acknowledge that it never had one more eminent than yourself, nor can it display greater achievements than those of your reign; for you esteeming the superintending care of other sovereigns as trifling, exerted yourself, having an eye to the first sovereign of the christians, I mean Constantine, the founder and protector of this city, whom you have greatly excelled in the most glorious actions, and in trophies, and in other achievements: and what you have done for the advantage of your subjects, and for the dispersion of your enemies, would be a task to

repeat,

* Constantinople.

repeat, and it would require much time, and a profusion of words. But you are labouring in what is useful in life, and what will be beneficial to posterity; for indeed in the first place you have, by your management and prudence, revived the study of philosophy and rhetoric, which had fallen into disuse, and were buried in deep oblivion, affording them a powerful protection; you afterwards revived the study of all the other sciences and arts: afterwards, knowing that civil government is divided into these three departments, I mean the Army, the Priesthood, and Agriculture, you bestowed no very small diligence on this branch, which is known to give stability to human life; whence by your exalted genius and profound understanding compiling such things as have been with great diligence and experience found out by different persons among the ancients concerning agriculture, and the raising of plants, and concerning the season, and the situation also, and the method suitable to each sort, concerning the finding of water, and the raising of edifices, and in what situations these ought to be built, and toward what part of the heavens, and in what manner, and many other things of equal importance, you have made public a work of universal

utility: for any person meeting with these elaborate treatises, may see those things which exactly suit his way of life, such as are useful and necessary, and by which human life is supported; and he may contemplate them, on which he has every attention bestowed with great elegance and order; he may see not only things that are necessary, but such as are superfluous, and conducive to please the eye and the olfactory organs: for you being a lover of what is amiable, or rather, if I must say the truth, a lover of the human race, you, by every method and by every attention, collect such things as are useful, always looking forward to the welfare of your subjects. May you, Constantine,[b] the most just of sovereigns, the delight and honour of royalty, be happy! may you be prosperous under the protection of the Almighty! and may you prove victorious over your enemies, always studying the consummate happiness of us your subjects!

[b] Supposed to be Constantinus Porphyro-Gemetus.

BOOK I.

HYPOTHESIS[c] OF THE FIRST BOOK.

Compiling such things as are related by different authors among the ancients, concerning agriculture, and the care of plants, and of things raised from seed, and many other useful things, I composed this book. It is indeed taken from the works of Florentinus, and of Vindanionius, and Tarentinus, and Anatolius, and Berytius, and Diophanes, and Leontius, and Democritus, and the Paradoxes of Africanus, and from Pamphilius, and Apuleius, and Varro, and Zoroastres, and Fronto, and Paxamus, and Damogeron, and Didymus, and Sotion, and the Quintilii. I have therefore thought it necessary and methodical to arrange the things according to due order, and to prefix to the work things which it is of use to persons applying to agriculture to know, according to priority. I have set down in this first Book such observations as relate to fine and tempestuous weather, and to the rising and setting of the apparent stars, and to effects produced from natural[d] causes.

I.—CONCERNING THE YEAR, AND THE DIVISION OF THE SOLSTICES.

IT is necessary that the husbandman should know the seasons, and the change of the solstices; for thus directing the workmen to their proper

[c] The title or contents, so called because they were written and set under the composition.

[d] Circumambient air, according to the Greek.

proper employment in every season, he will be of consummate service to the soil. Most persons, and among the first, Varro the Roman, has said, that the beginning of the spring is when Favonius generally begins to blow, which is about the seventh[e] of the ides of February, the sun being in Aquarius, having attained three or five parts, that is, possessing three or five days in the sign; but the spring is completed on the nones of May: that the summer begins about the eighth of the ides of May, the sun being in Taurus, but that it is completed about the seventh of the ides of August; that the autumn also begins about the sixth of the ides of August, the sun being in Leo, but that it ends about the fifth of the ides of November; that the winter indeed begins about the fourth of the ides of November, the sun being in Scorpio, but that it ends on the day before the eighth of the ides of February. But in relation to the solstices, the winter solstice is about the eighth of the

[e] The Greek writer agrees with Varro in fixing the beginning of the spring; but he does not precisely agree with him in determining the beginning of the other seasons. As Nature has not exactly prescribed the limits between the seasons, it is no wonder the Greek and Roman writers did not fix them within the compass of a day.

the calends of January; the summer solstice is about the eighth of the calends of July, although some will have it to be about the sixth of the nones: and in respect of the equinoxes, the vernal equinox is about the eighth of the calends of April, but some will have it to be about the ninth; and the autumnal equinox is about the eighth of the calends of October, or about the sixth. The rising of the Pleiades begins about[f] the fourth of the ides of June; but their setting is about[g] the fourth of the nones of November. The feast of Bruma is about the eighth of the calends of December.

II.—PROGNOSTICS OF FAIR WEATHER.

THE moon appearing small and clear when three or four days old, portends fair weather; and when full, if it appears clear, it is sign of fine weather; and if when half full it looks clear, it announces favourable weather; but being more red than usual, it is a sign of wind. If any part of it appears blackened, it is a sure token of rain. The sun likewise rising clear is a

[f] Columella says, they rose about the fifth of the ides of May, lib. ix. cap. 14.

[g] This passage seems to be of questionable authenticity.

a sign of fine weather; and when a small cloud appears before it rises, it will be fine; and when it sets, if there be clouds dispersed around it, they are a sign there will be no rain; and when it sets clear without clouds, it is also a sign the following day will be fine; and if the sun sets without clouds, but red clouds are stationed near it afterwards, it will not rain that night nor the following day. Red clouds dispersed about sun-setting are a sure token there will be no rain; and the owl howling incessantly in the night, and the raven making a gentle noise in the day-time, and many crows in company, as it were rejoicing and clamouring, plainly portend fair weather.

III.—PROGNOSTICS OF TEMPESTUOUS WEATHER; AND FROM WHAT SIGNS WE ARE TO EXPECT RAIN.

THE moon being three or four days old, having its extremities obtuse and dark, indicates rain; and its orb appearing red or like fire, is a sign of tempestuous weather: and when it is full, if it appears at all black, it is a manifest prognostic of rain; and if there are

two or three[h] wheels around the moon, they are unerring tokens that it will be tempestuous, and especially if they are more than commonly dark. The sun likewise, when it rises red and of a dark hue, portends showers; and when the sun rises, if a dark cloud appears near its rays, it is a sure sign of rain. When the sun also sets, if it has a black cloud near it on the left side, you must expect rain very soon; and thunder and lightning, from what quarter soever they proceed, evidently indicate a tempest from that part. If indeed thunder is heard sometimes from the south and sometimes from the north, and if there are flashes of lightning, wind will ensue; and when aquatile and marine birds are continually washing themselves, they undoubtedly indicate tempestuous weather.

The rainbow appearing double, foretels rain. When sparks[i] are also produced on pots and brazen

[h] Αλωνες: this word means, in its primitive signification, threshing-floors, which the Greek and Roman writers recommended to be constructed in a circular form, that, as they were made in the open air, water might the more easily descend from them; for they were of opinion, that if they were made of this form, they would be kept dry with more facility than if they were laid in any other figure.

[i] Aratus mentions this circumstance, v. 206.

brazen pans, they are certain signs of showers; and the raven washing its head on the sea-shore, and swimming, and vociferating loudly in the night, indicates rain; and barn-door fowls frequently covering themselves with dust, and clamouring, and crows and jackdaws appearing in companies and vociferating, and swallows flying and twittering about pools or fish-ponds or rivers, denote rainy weather; and flies stinging with much vehemence, and geese hastening to their food with clamour, and spiders descending when there is no wind, and the flames of the lamp being of a blackish colour, and the flock wantonly capering, are certain signs there will be tempestuous weather; and the cattle looking toward the south, and licking their feet, and coming to the ox-stall lowing, are manifest signs of rain; and the wolf likewise coming with confidence near the house, and dogs digging the ground, and the[k] screech-owl hooting in the morning, are sure tokens of rain; and birds flying toward the sea-coast portend a tempest. Cranes coming forward in a hurry, manifestly indicate there will be a tempest; and mice becoming noisy are a sign of tempestuous weather.

[k] Sometimes called the tawny, sometimes the common brown or ivy owl.

weather. When therefore many prognostics concur, your expectation is the less dubious; but you must particularly observe every fourth day of the increase or decrease of the moon, which affect the state of the atmosphere.

IV.—PROGNOSTICS OF A LONG WINTER.

The holm oaks, and oaks producing much fruit, are true indications that there will be a very long winter; and[1] she-goats and sheep being covered, and wishing to be covered again, are signs of a long winter; and if the cattle dig the ground, and direct their heads toward the north, they forebode a hard winter.

V.—PROGNOSTICS WHETHER THE SEASON WILL BE EARLY OR LATE.

It is better to know in time whether the season will be early or late; for it is more adviseable to use more seed, when the season promises to be late, because some of the seed perishes in the intermediate interval. If rain then falls after the vintage before the setting of the Pleiades, the season will be early; but if it is showery, when the

[1] See Aratus, v. 336.

the Pleiades set, it is middling; but if the rain begins after the setting of the Pleiades, the season will be late. But Democritus and Apuleius say you must expect there will be such a winter as the day of the feast is, which the Romans call Bruma, that is, the four-and-twentieth day of the month Dios or November[m]: some authors also assert from observation that according to the similarity of the four-and-twentieth of the month called Dios, or November, in which the feast of Bruma happens, will be the following month of December; but as the five-and-twentieth day of November will be, such will be the month of January; and as the six-and-twentieth day of the month of November will be, such will be the month of February: but this indeed sometimes happens, and sometimes it is quite the contrary. Some indeed affirm from observation, that from the seventh of March to the ninth of the same month the weather is usually more cold; for on those days the forty martyrs[n], betrayed into the hands of the Pagans, suffered martyrdom.

VI.

[m] Some critics have been of opinion that the christian emperors transferred the feast of Bruma from December to the month of November.

[n] This event took place in Armenia, in the reign of Licinus, A. D. 316.

VI.—CONCERNING THE MONTH ACCORDING TO THE MOON.

Some think that you are to plant nothing when the moon is waning, but when it is increasing: others indeed advise it to be proper to plant from the fourth day of its age to the eighteenth. Some permit the cultivator to plant on the antelunar days only, that is, on the three first days from the new moon: others avoid planting any thing from the tenth to the twentieth day, lest its light afterwards decrease with the plants. But the precise doctrine with regard to the fore-mentioned observations, and which is of superior utility, is this: to plant, when the moon is under the horizon*; but to cut down wood, when it is above the horizon.

VII.—IT IS NECESSARY TO KNOW WHEN THE MOON IS ABOVE AND WHEN IT IS BELOW THE HORIZON.

As it is necessary that many works in agriculture should get on sometimes when the moon is above

* *Under the earth* is the Greek expression: it has been supposed by some that υπο γην here ought to be υπερ γην, and the other member of the sentence υπο γην.

above the horizon, sometimes when it is under it, I have thought proper to demonstrate, from the new moon to the thirtieth[p] day, under each day, from what hour of the night and of the day the moon is below or above the horizon. The moon then begins to be under the horizon on the new month from half an hour in the night to half an hour in the day; on the second day, from an hour and a half in the night to an hour and a half in the day; on the third day, from two hours and a quarter in the night, to two hours and a quarter in the day; on the fourth day, from the third hour and a third part in the night, to the third hour and a third part in the day; on the fifth, from the third hour and sixteen parts of an hour in the night, to the same period in the day; on the sixth day, from the fourth hour and nine parts in the night, to the same parts in the day; on the seventh day, from the fifth hour and six parts and a half, to the same division in the day; on the eighth, from the sixth hour and four parts of an hour in the night, to the same parts in the day; on the ninth day, from the seventh hour and eleven parts and a half of an hour in the night,

[p] See Pliny, 18, 32. A synodical month, *i. e.* the interval from one new moon to another, consists of 29 days, 12 hours, 44 minutes, 3 seconds.

night, to the same in the day; on the tenth[q] day, from the eighth hour and eight parts of an hour in the night, to the same parts in the day; on the eleventh day, from the ninth hour in the night, to the same hour in the day; on the twelfth day, from the tenth hour and sixteen parts in the night, to the same period in the day; on the thirteenth day, from the eleventh hour and three parts in the night, to the same time in the day; on the fourteenth day, from that interval to the same time in the day; on the fifteenth, it is in[r] its splendour from the rising of the sun to its setting, when we shall do our work to the greatest advantage in the day-time; on the sixteenth day, from half an hour in the day to the same period in the night; on the seventeeth day, from the first hour and seventeen parts, to the same time in the night; on the eighteenth day, from the second hour and four parts and a half in the day, to the same parts in the night; on the nineteenth day, from the third hour and three parts in the day, to the same parts in the night; on the

twentieth

[q] This anonymous section varies so much, particularly from this part, in the printed copies and manuscripts, that it would be no small difficulty to reduce it to a standard within any sufferable approach to correctness.

[r] Καλλιστη; literally, very beautiful.

twentieth day, from the third hour and sixteen parts in the day, to the same period in the night; on the one-and-twentieth day, from the fourth hour and nine parts in the day to the same period in the night; on the twenty-second day, from the fifth hour and six parts and a half in the day, to the same time in the night; on the twenty-third day, from the sixth hour and four parts in the day, to the same parts in the night; on the twenty-fourth day, from the seventh hour and eleven parts and a half in the day, to the same period in the night; on the twenty-fifth day, from the seventh hour and eleven parts in the day, to the same interval in the night; on the twenty-sixth day, from the eighth hour and six parts and a half in the day, to the same time in the night; on the twenty-seventh day, from the ninth hour and nine parts and a half, to the same parts in the night; on the twenty-eighth day, fromthe tenth hour and sixteen parts in the day, to the same division in the night; on the twenty-ninth day, from the eleventh hour and three parts in the day, to the same period in the night; on the thirtieth day, from the setting of the sun to its rising.

VIII.—CONCERNING THE RISING OF THE DOG-STAR, AND THE PRESCIENCE OF OCCURRENCES FROM IT.

The rising of the dog-star is on the twentieth[s] day of the month of July. You must then observe in[t] what part the moon is when this rises. If it rises, the moon being in Leo, there will be an abundant crop of corn, and plenty of oil and wine, and all provisions will be cheap. There will be tumults and slaughter, and the appearance of a king, and uncertain weather; and one nation will invade another, and there will be earthquakes and inundations: but being in Virgo, there will be abundance of rain, joy, death of women in childbed; slaves and four-footed beasts will be cheap. Being in Libra, there will be the removal of a tyrant, four-footed beasts will be easily procured, and there will be tumults among the populace, scarcity of oil, and blight among the corn, but plenty of wine and of nuts[u]. Being in Scorpio, there will be discontent in the priest-hood,

[s] The Quintilii in the next chap. say the 24th.

[t] *In what house*, in the Greek. The Arabs make use of the same expression.

[u] Of fruit, with hard integuments, in the Greek.

hood, and destruction to the apiary, and pestilential havock: when it is in Sagittarius, there will be a plentiful year, and many showers, and abundance of corn, and joy to the human race, but havock in the herd, and a plentiful increase of the feathered tribe: if it rises when the Moon is in Capricorn, there will be marching of armies, and many showers, and abundance of corn, and wine, and oil; all things will be cheap: if it rises when the same luminary is in Aquarius, the dissolution of a tyrant will happen, the wheat will be injured; there will be an incursion of locusts, and little rain, and pestilential diseases: if it rises when the Moon is in Pisces, there will be plenty of rain, and destruction to the feathered race; and there will be plenty of wine and corn, but disease among the human race. If the Dog-star rises when the Moon is in Aries, there will be much havock in the flock, and much rain, and a scanty crop of wheat, and plenty of oil; if indeed in Taurus, there will be a great deal of rain, and hail, and blight*, and divine wrath; if in Gemini, there will be plenty of corn, and of wine, and of every fruit, and the removal of a tyrant, and destruction to the human race, and

* Ἐρυσίβη. The grain affected by it was of a reddish or copper colour.

movement of armies; but if in Cancer, there will be drought and famine.

IX.—THE RISING AND SETTING OF THE APPARENT STARS.

SINCE it is necessary that husbandmen should know the rising and setting of the apparent stars, I have written concerning them; so that persons wholly illiterate may, from memory, know the periods of their rising and setting. On the calends of January, the Dolphin rises; on the twenty-sixth of February, Arcturus rises in the evening; on the calends of April, the Pleiades set late at night; on the twenty-third of April, the Pleiades rise with the Sun; on the twenty-ninth of April, Orion sets in the evening; on the thirtieth of April, the Hyades[*] rise with the Sun; on the seventh of May, the Pleiades appear in the morning; on the nineteenth of May, the Hyades appear in the morning; on the seventh of June, Arcturus sets in the morning; on the twenty-third of June, Orion begins to rise; on the tenth of July, Orion rises in the morning; on the twenty-

[*] The old Romans called these *suculæ*, because they thought they had their appellation from ὗς.

twenty-third of July, Procyon rises in the morning; on the twenty-fourth, the Dog-star rises in the morning; on the twenty-sixth of July, the *etesiæ*[7] begin to blow; on the thirtieth of July, the splendid star in the Lion's breast rises; on the twenty-fifth of August, Sagitta sets; on the fifteenth of September, Arcturus rises; on the fourth of October, Corona rises in the morning; on the twenty-fourth of this month, the Pleiades set at sun-rising; on the first of November, the Pleiades set in the morning, and Orion begins to set; on the twenty-second of November, the Dog-star sets in the morning.

X.—PRESCIENCE OF EVENTS FROM THUNDER EVERY YEAR, AFTER THE RISING OF THE DOG-STAR.

You must take notice of the first thunder every year, that happens after the rising of the Dog-star. It must therefore be observed in what[a] division of the circle of the Zodiac the Moon is,

 when

[7] Anniversary winds, which blew from the east.

[a] In the Greek, in what house.

when the first thunder takes place. If it thunders when the Moon is in Aries, it is a sign that some persons in the country will be under consternation, and that there will be solicitude and flight among the human race, but afterwards tranquillity. If it thunders when the Moon is in Taurus, it is a sign that the wheat and barley will be injured, and that there will be affliction from locusts, but mirth in the royal palace; and to them in the east, vexation and famine. If it thunders when it is in Gemini, it portends trouble and disease, and injury to the corn, and perdition to the Arabs. In Cancer, it is a sure sign of hurt to the crop of barley, and of drought, and of perdition to the herd, but toward March and April of plenty of rain. In Leo, it portends injury to the wheat and barley in mountainous situations, and cuticular and impetigenous complaints. In Virgo, it is the sign of destruction to a tyrant, and that one of another country shall govern; it portends danger to mariners, and blight in the corn-field. In Libra, it is a sign of war, and of abundance of wounds, and of injury to the fruits of the earth. In Scorpio, there will be famine, but the feathered race will increase. In Sagittarius, it is a sure sign of commotion in the country; in mountainous situations,

of

of a good crop of corn; and in champagne grounds, it is a sign of a bad one. In Capricorn, it is a sign that there will be rain during forty days; and it portends treachery of royal powers, and reprehensible conduct, and improper loquacity, and the appearance of another king from the east, who will subjugate all the world; but there will be plenty of fruit, and eminent personages will die, and there will be an increase of the woolly tribe. In Aquarius, it is a sign of violent wars on the sea-coasts, of some injury to other fruits of the earth, but of destruction to pulse. In Pisces, it is a sure sign of some injury to the wheat, and of the death of a potentate.

XI.—CONCERNING THE NAMES OF THE WINDS, AND HOW MANY THERE ARE, AND FROM WHAT PART EACH BLOWS.

THE four primary winds blow from the four quarters of the heavens, Subsolanus, Favonius, Boreas, and Auster. Subsolanus indeed, coming from the eastern point, has Eurus and Kaikias blowing on each side of it; and Favonius, blowing from the western point, lies between Iapyx and Africus; and Boreas, blowing from the arctic

arctic point, has Thraskias and Aquilo, which confine it in the middle; and Auster, coming from the south, has Libanotus and Euronotus, which confine it in the middle; so that all the winds amount to twelve: but Favonius is more favourable to agriculture than all the other winds; and Florentinus asserts this, and we acknowledge it. The sea, when its waves become high, and when they resound with violence on the shore, foretells wind; and so do the tops of mountains, when they appear clear; and so do thorns and dry leaves, when they are driven in a contrary direction from[a] the winds. Thunder and lightning, from what part soever they come, announce wind from that quarter. Where the stars seem to fall, you are to expect wind from that part.

XII.—JUPITER'S REVOLUTION OF TWELVE YEARS, AND ITS INFLUENCE WHEN IT GOES ROUND THE TWELVE DIVISIONS OF THE ZODIAC.

THE circle of the Zodiac is divided into twelve[b] parts: three indeed vernal, Aries, Taurus, Gemini: for the summer division there are three

[a] Under, in the Greek.

[b] Houses, in the Greek.

mer, Cancer, Leo, Virgo; three for autumn, Libra, Scorpio, Sagittarius; three for the winter quarter, Capricorn, Aquarius, Pisces: Jupiter* therefore, going through every division, has the influence hereafter ascribed to it. When Jupiter is in Aries, being the house of Mars, the whole year indeed will be infested by the north wind, and participating with the south-east wind, the winter also cold and snowy, and there will be perpetual showers and overflowing rivers; but, after the vernal equinox, the temperature of the air changes to gentle and frequent showers, and the summer will be temperate and healthy: but the autumn will be hot, and there will be diseases, and especially in the head, and catarrhs and coughs; champagne situations will produce fruit, but you must pray that there may be no wars. Democritus indeed says, that wine is good and fit to keep, and that the season is well calculated for planting the vine alone; that you must also take care of your corn on the threshing-floors, on account of the showers; that there is a scarcity of the feathered race; and that it is proper to forward your garden plantations. When it is in Taurus, in the house of Venus, the beginning

* The star of Jupiter, in the Greek.

ning of the winter indeed will be temperate and showery, but the middle part snowy, and the end of it cold: if it is wintery from the middle of the season to the vernal equinox, the spring will be temperate and moderately wet to the rising of the Dog-star, the summer hot, the autumn frosty and unhealthy, especially to young people, and there will be inflammation of the eyes; champagne situations will be more fertile than such as are mountainous; wine will not be so plentiful, and you must gather the fruit of the vine late in the season; but there will be plenty of fruit on other trees; a scarcity of the feathered race. The year will indeed be unfavourable to mariners: in such a year an illustrious personage will die. Democritus says, there will be much hail and snow in such a season, but that the *etesiæ*[d] do not blow equally; and you must pray there may be no earthquakes and movement of military force. But when Jupiter is in Gemini, in the house of Mercury, all the year will be infested by the south and south-west wind, and the beginning of the winter will indeed be windy, but the middle of it temperate, and its end frosty and windy; the spring temperate, with mode-

rate

[d] See chap. ix.

are showers, and there will be a good crop of wheat; the summer will be temperate, because the etesiae blow briskly for a considerable time. The crops on the threshing-floors will disappoint the hopes of the farmer, especially in Syria; and there will be diseases in autumn, particularly among young people, and the middle-aged, and women; and there will be inflammations of the eyes, when the autumn is hot, and women will die; there will be plenty of fruit on trees, but the fountains of water will become deficient; and it will be proper to lay up the fruit on account of the sterility that may happen the following year. Democritus says the hail will be hurtful, and you must pray that there may be no pestilential diseases. When Jupiter is in the house of the Moon, in Cancer, the winter will be cold, with easterly winds and hail, and dark, having the rivers overflowed; but about the winter solstice the waters will abate, and, after the vernal equinox, there will be much hail, but rough situations will bear more fruit, and the year indeed will be healthy, except in autumn: but Democritus says, that pustular eruptions rise about the mouth in autumn; you must therefore eat herbs in the spring, and take physic, and especially young men, and you

must

must drink genuine wine. The olive will be fruitful. When Jupiter is in Leo, the house of the Sun, the beginning of the winter indeed will be cold and wet, with high winds, so that trees will be blown down, but the middle temperate, and the end cold; the spring rather showery, the summer like the spring; and the fountains of water will fail, and pasture will also become scarce for the herd. The autumn will be hot and unhealthy, with catarrhs[e] and coughs; you must therefore make use of little bread, and more wine; there will be a tolerable crop of wheat; the vine and the olive will be fruitful; the season will be adapted to emplastration, not so well for planting; there will be death in the herd, but an increase of wild animals; a person of distinction will die; and you must pray there may be no earthquakes and wars. When Jupiter is in Virgo, the house of Mercury, the beginning of the winter indeed will be cold, but the middle of it temperate, and the end stormy, having plenty of frost and rain and overflowing rivers, so that many places will be covered[f] with water; the spring will be wet and unfavourable to trees,

[e] From, in the Greek.

[f] The Greek word conveys great strength of expression.

trees, and when the spring terminates there will be hail in some places; the summer will be wet and dark, and you must harvest your corn early, that it may not be injured by the rain; the autumn will be windy and healthy; the vine will be fruitful: the season will be adapted for planting the vine; the wheat will be easily injured; the whole year will be healthy, having no disease; you must indeed pray for the fruits of the earth. When Jupiter is in the house of Venus, in Libra, the beginning of the winter indeed will be wet, and the middle temperate and windy, but the end moist and frosty; the spring temperate, but producing complaints in the head; the beginning of the summer like the spring; the year will be dangerous to pregnant women. But Democritus says, that there will neither be overflowing rivers this year, nor much hail, but that the autumn is generally wet. But when Jupiter is in the house of Mars, in Scorpio, the beginning of the winter will be cold with hail, and the middle of it warm, and the end mild; the spring will be cold till the summer solstice; when there are showers and thunders, the fountains of water will be deficient; there will be a moderate crop of wheat; the vine and the olive will bear plentifully;

there

there will be disease in the herd. Democritus indeed says that the rivers will be overflowing, and that there will be sickness about autumn; you must therefore pray that there may be no pestilential diseases: he says, you must eat little, but drink more bountifully. When Jupiter is in his own house, in Sagittarius, there will be a temperate and moist winter, neither warm nor cold; the rivers will be full, but when the winter ends there will be cold and wind; the spring will be moist and showery; and the summer temperate and rather cool: but you must secure your threshing-floors on account of the showers: the autumn will be healthy, on account of the blowing of the *etesiæ*; the early and late fruit will be good, but the middle crop faulty; champagne and rough situations will produce a plentiful crop of wheat; the wine that is produced from a late vintage will be fit for keeping; all trees will bear well; the year will be fit for planting, and for all other work; there will be a plentiful increase of large animals, but there will be disease among dogs; the sea will be boisterous, and there will be violent winds late in the season; an illustrious personage will end his career. If Jupiter is in Capricorn, in the house of Saturn, the beginning of the winter will indeed be temperate, but the

middle

middle of it wet and cold, and the end windy; and the waters will be noxious to what is sown, and to other agricultural works; and there will be a general increase of water, and of cold and [illegible] the summer, before the rising of the Dog-star will be unfavourable, and, after that, hot and [illegible]; the *etesiæ* will blow strong, and there will be earthquakes; the champagne situations inland will produce a greater crop; the wine will be spoiled by the frost; there will be a good crop of fruit on trees; the year will be favourable to small beasts, but unfavourable to large ones, especially to oxen: in the autumn there will be diseases from head-ach and from inflammation of the eyes, and from cuticular complaints; and you must pray the fruit may not be hurt by the frost and by the winds. When Jupiter is in Aquarius, in the house of Saturn, there will be much wind, favourable to the crop of wheat, and particularly so to the bearing of trees: the beginning of the winter indeed will be cold, and the end of it windy; the spring wet and winter-like, and frosty, and the summer windy from the violence of the *etesiæ*; and there will be so much rain in the summer, that the crop of corn may be partly overflowed; in the autumn arise winds, attended with rain, and hurtful to the fruit; and

there

there will be acute diseases from too much wet, among young people and the middle-aged; and there will be frost, and it will hurt the grapes in many places; but the corn-grounds will be very promising, the early and the late sown: but there will be a decrease of the feathered race and of wild beasts; and there will be numerous shipwrecks; and a person of distinction will die. You must indeed pray that there may be no pestilential diseases, and earthquakes, and thunder. When Jupiter is in Pisces, in his own house, the winter indeed begins with wet, but the middle of it is windy, and its end is attended with hail and snow; in the spring the western winds blow liberally, but the summer will be hot, the autumn excessively hot, particularly unfavourable to women and virgins; and noxious winds blow, so that the fruit on trees is blighted; the corn-grounds will be in good order; you must secure your threshing-floors, on account of the rain; the year is dangerous to women with child. Democritus indeed says that the vine and the olive will be fruitful. You must pray there may be no earthquakes.

XIII.—CONCERNING THE SUN AND THE MOON.

The Sun, by the power of its own heat, draws up the moisture; and the Moon, being of a humid nature, makes a due mixture and temperature. [illegible] calls those days of lunar invisibility, from the twenty-ninth to the second day, on which the Moon is hidden[g] by the Sun, and it does not appear to the human race.

XIV.—CONCERNING HAIL.

When you meet with the stone[h] chalazites, keep it, and, when a hail storm appears, strike it with steel on the opposite side, and the storm will be averted:[i] taking also the right wing of an eagle, bury it in the middle of your ground, and neither your vine nor your corn will be injured by the frost: if you also bind one of your most conspicuous vines with a thong from the skin of a seal, no injury happens from hail, as Philostratus relates in his historical treatise.

Some

[g] Υπο τας ακτινας τȣ ηλιȣ. Literally, under the rays of the sun.

[h] Pliny describes this stone, xvii. 11, s. 73.

[i] See Pliny, ii. 55.

Some indeed say that, if you shew a looking-glass before an incumbent cloud, the hail will pass by; or, if you carry the skin of a hyæna, or of a crocodile, or of a seal, around your ground, and hang it before the gates of the house, the hail will not come down: and if you hang a number of keys of dwelling-houses on ropes round your ground, the hail will pass on: and if you place representations of animals in your houses, this will be of signal utility: and if you take a tortoise found in the marshes in your right hand, in a supine posture, having thrown some mould round it, that it may not be able to turn and to get away, for it will not be able if the earth is made hollow under its feet, for having no firm hold it remains on the spot, the hail will not fall on your arable land, nor on any place, when this is done. There are some indeed who say that the tortoise must be taken and deposited on the sixth hour of the day or of the night. But Apuleius, the Roman, says that, having painted a grape on a tablet, you are to consecrate it in the vineyard when Lyra sets, and that your fruit remains unhurt. Now Lyra begins to set about the tenth of the calends of December; indeed it fully sets on the first of the nones of February. These things have

indeed

indeed been mentioned by the ancients. But I think that some of these relations are quite incongruent[k], and to be waved; and I advise all persons not to give attention to such things by any means. But I have written these things for this reason, that I may not seem to omit any of the things that have been related by the ancients. Pieces of the skin of a hippopotamus, set on all the boundaries, prevent the falling of hail.

XV.[l]—CONCERNING THUNDER.

Bury the skin of a hippopotamus within your ground, and thunder will not fall there.

[k] Indecorous, in the original.

[l] I have prefixed XV. to this chapter, which in the original is the XVIth; the XVth, which was on the subject of hail as well as the preceding, being lost.

BOOK II.

HYPOTHESIS.

These things are contained in this book, being indeed the second concerning the select precepts of agriculture, and comprising what things are consigned to the ground; and concerning the different kinds of produce, I mean of wheat and barley, and of other crops that are called pulse, in the following chapters. But I must now first of all begin with that which is of a more general nature.

I.—THE PRESENCE OF THE MASTER IS OF GREAT USE TO THE FARM.

THE continual presence of the master makes the farm much more valuable; for it directs all to attend to their work, and reminding them of such things as are not done, it makes them do their duty; and by praising them who are attentive to their work, and finding fault with them who are tardy, it promotes among all one view of diligence and of affection for what is useful.

II.—YOUNG MEN ARE MOST ADAPTED TO AGRICULTURAL LABOUR; AND IT IS PROPER TO MAKE A CHOICE OF LABOURERS FOR THE DIFFERENT KINDS OF WORK, AND TO SELECT A FIT PERSON FOR EVERY WORK.

Every age then has its degree of fitness for agriculture; but boys are particularly adapted by their age, being brought up to work, and serving in inferior capacities, and paying exact attention to every thing that is done; being able, with facility, to bend themselves[m] to weed, and to gather leaves and the produce of the earth; learning by experience, practice, and care, from the older labourers. A ploughman indeed must be higher in stature; for such a man, bending forward with power over the plough-tail, pressses down the share, so that the furrow may not be too shallow, and the force of correction coming from some degree of height touches the oxen more powerfully. Persons working in the vineyard need not be so tall indeed, but square built; for

[m] To pull up the agrostis, is the Greek expression.

for such[a] a person not applying at an aukward distance to the culture of the vine, but being low in stature, works without fatigue. We are to appoint herdsmen that are strong and tall in stature, and such as have a powerful voice, lest, when they are short in stature, the oxen going before them conceal them, and that they may be able to see what things are before the herd, and that they may terrify the oxen by the roughness of their voice. Goat-herds ought to be light and swift-footed, that they may overtake the goats by their celerity.

III—. IN WHAT PLACES AND SITUATIONS HOUSES ARE TO BE BUILT, AND TOWARD WHAT PART OF THE HEAVENS, AND CONCERNING BATHS.

SITUATIONS near the sea are generally more healthy, and such as are on mountains, and such as are on declivities inclining toward the north; but the situations that are near marshes and standing water, and in hollow places, or exposed to the south wind, or to the west, are unhealthy. Habitations then must be built in more exalted situations;

[a] This transition is according to the original.

situations; for such a place is best adapted for [illegible] and for a view* and a prospect. But the [illegible] is to be toward the east, and the doors, [illegible] winds blowing from the eastern regions [illegible] healthy; and the warmth of the sun easily rarefies and dissipates the thickness [illegible]ness of the air. But the edifices ought not to be made too low, nor narrow, but spacious, wide, and lofty. Some persons indeed advise houses to be built towards the south, for the sake of having the sun during a longer continuance, but I say that a building is better raised toward the east, because the south wind blowing from the meridional point, brings wet, and it blows unequally, and it is very unhealthy. You ought, on the contrary, to make your baths not having a view toward the north and the constellation called the Bear, but toward the setting of the sun in winter, or toward the south: and let there be wide and exposed to pure air; for pure air finds its way when a situation is not near dung-hills, and places that have an unwholesome smell. The furnaces of these indeed ought to be on the ground, and in the inside inclined, on a

* According to the Greek, *view* signifies the things that are seen from the habitation. What I have translated *prospect* means properly the objects that are seen underneath.

descent, that the blocks of wood thrown into them, getting in, may not find their way out, and that the flame confined within may afford much warmth to the boiler.

IV.—OF FINDING WATER.

WHERE the chaste tree, by some called Agnus, or the Conyza, or the Othleis[p], or Reeds, or the Columbatos[q], grow by themselves, or what is called Trefoil[r], or Potamogeiton[s], or where the bush appears by itself, there dig. But a more useful experiment for finding water is thus made. Let a person dig a trench of the depth of three cubits, in any situation he is pleased, and let him get ready a leaden vessel in the form of a hemisphere, or a caldron; and when the sun is setting, let him rub one of them with oil, and taking some wool, that has been washed, dry,

clean,

[p] So called, because they grew where there was water. The word, in the earlier ages of Greece, it is probable, was written Υθλις.

[q] See Galen, l. i. p. 426. Bas. vol. 2.

[r] Τριφυλλος, Matthiol. iii. 106.

[s] So denominated, because it grew near rivers. See Matthiol. l. iv. 96.

[illegible], about a handful, let him tie a small stone [illegible] the [illegible] of the wool, and let him fasten the [illegible] pot with wax, that it may not fall; let [illegible] lay the pot inverted in the trench, taking [illegible] that when the vessel is turned, the wool may [illegible] down to the middle of it; and let him cover [illegible] the vessel to the depth of a cubit, and let it remain during the night; and in the morning, [illegible] sun-rising, taking away what were laid on, [illegible] turn the vessel, and if the place contains [illegible], he will find drops in the vessel, and the [illegible] well moistened with water: and if indeed [illegible] is much humidity, so that it resembles tears, [illegible] water is near; but if the moisture appear [illegible], there is water indeed, but at some depth: [illegible] if no symptom of this kind appears, you must [illegible] the same experiment in another and another place, and fixing, as a man ought, on situations likely to gratify your hopes with respect to water.

V.—ON THE SAME SUBJECT.

High mountains having many tops have water, and especially the parts of the mountains exposed to the north or to Arctos. A black and

 rich

rich soil, or one that is stony, and especially if it has stones of a sable hue, and of a yellowish colour, produces water. In champagne situations indeed, where the soil is of potter's clay, abounding with pebbles and pumice-stones, and having a squalid and poor appearance, that is, dry and denudated, there is no water, as well as where it is potter's earth, and such as keeps off and repels showers and storms; but that which receives rain and absorbs it, is still dryer. Water indeed lies under the surface, where the Agrostis, Plantain[t], Heliotropium, Butomus[v], Brambles, Hippuris[u], Calaminth[w], the small and soft reed, Callitrichos[x], which is the Adianthos, Mellilotus, Oxylapathus[y], Pentedactulus[z], Polugonus[a], or Platuphullus, the Rush, Struchnos[b], Stratiotes[c], Tussilago[d],

[t] Αρνογλωσσον. Matth. ii. 119.

[v] Flowering rush or water gladiole. Bod. p. 462. Dodon, p. 591.

[u] Horse tail, Matth. iv. 42.

[w] Καλαμινθη, Matth. iii. 36.

[x] Maidenhair; Matth. iv. 131.

[y] A species of rumex, Matth. l. ii. c. 108.

[z] Cinquefoil, Matth. iv. 38.

[a] Sanguinaria, Matth. iv. 4.

[b] Matth. iv. 66.

[c] Water soldier, or water aloe, Matth. iv. 97.

[illegible][d], Chamæleo[e], grow. Where there are plants standing thick, green and flourishing, the quantity of water will be abundant in proportion. Crabs are useful animals in watery places, for they open the veins, and they deepen the bottoms. Black and deep earth produces sweeter and more copious veins; and that which is split in a clay produces water, and what is more, that which is sweet. If water appears in a loose soil, you must be satisfied with what there is, and not seek a greater quantity, lest you lament the loss of what there is. Some veins of water incline from below, and some come from transverse directions; but those which spring upwards are more permanent. You must therefore dig to some depth, until the origin of the stream appears, that it may flow without intermission and permanently. The veins indeed which run in transverse directions are less permanent than the others, for they are derived from hyemal and vernal rain. To know whether a soil contains water, some persons do this: having dug a trench, of the breadth of a cubit, but of the depth of three cubits, they lay in the spot that is dug, a dry sponge at noon-day for three hours,

and

[d] Matth. iii. 109.

[e] Matth. iii. 8. 9.

and they cover it with the leaves of green reeds, or with some other tender grass; and if it contains moisture, there will be water; but when it is dry, there will be none. Or you may ascend a more exalted situation, and you must look toward the sun before it rises, before the air is enlightened; and if it seems to draw up any thing misty, before it is rarefied, there will be a hope of your meeting with water. Observe likewise, when the sun first shines, gnats flying straitly upwards and moving, having some resemblance to a pillar, these are also manifest signs of water. You must also observe from a more exalted situation, in the summer indeed, at noon day, when the air is clear, and when the earth is very free from moisture; for at that time a vapour ascends from places containing water, and it seems like a small cloud: such a place truly produces a vapour in the winter, like that which arises from rivers and pools and wells; and the quantities are indeed numerous and resembling clouds, but these are thin and like air. If the water has a bad taste, we are to throw in some bruised coral or pounded barley, and tying it in a cloth we are to lay it in the water. Eels and river-crabs thrown into the water destroy leeches. The signs indeed of good

water

which are the rush, the reed, the lotus[f], and the bramble.

VI.—ON THE SAME SUBJECT.

We will now speak on the subject of finding, or, as some say, of searching for water. But they who have made experiments in respect to the finding of water, assert that champagne grounds have no water in general, and such as are extensive less than such as are smaller; and that mountains for the greater part abound with water, and that the lowest have more water than the highest parts, and such as are well shaded and covered with trees more than they which are naked. The kinds of water found in champagne situations are for the greater part unsavoury[g]; but those in mountains and toward the lowest parts of them, are sweet, unless the taste of some of them be corrupted through the property of the waters that are above them being crude and unsavoury, containing natron or alum, or sulphur, or something else of this kind. They also adduce these physical reasons in support of their assertions, that the sun perpetually

[f] There is a tree and a herb, each of which comes under this denomination. Matth. i. 134. iii. 106, iv. 106, 107, &c.

[g] Ἁλμυρά, Brackish.

ally draws from the water that which is the most subtile and the most light; that the sun indeed having the champagne grounds under its power during the whole day, extracts their moisture and deprives them of their vapour, whence they truly become perfectly destitute of water; and in those in which some portion is left, it is found to be altogether unsavoury, the light and sweet particles being drawn up out of it, as it happens with regard to the sea: but that the water in mountains does not suffer the same inconvenience, because it has not the sun on it during the whole day, and its rays are in an inclined direction to it, and they do not fall on it with so much power; hence the mountains that are inclined toward the north are more exuberant in water than those that are inclined toward the south; and those that are toward the east and west are less so than those toward the north, but more exuberant than those inclined toward the south: and the mountains that are well wooded are more exuberant than such as are naked, because they are shaded; and the inferior streams are more copious, because it is the nature of water to descend and to be collected from exalted situations to such as are low and at the bottoms of mountains; whence there are many fountains and streams in such situations, where

there

there are large and lofty and shady mountains lying above them, having hollow and cavernous passages; for in such situations the showers that are collected during the year, and percolated through the earth, increase the fountains; and [illegible] sometimes does not appear indeed in these high places, but having made its way for some [illegible] under ground, it is propelled into an open situation, and it generally runs in an open channel into the sea. Sometimes water, also conveyed [illegible] to the sea through the earth for a great distance, breaks out, as the water at Arados[h] and Heraclea[i], in Pontus. But they denominate the waters that come from high situations defluous[k] fountains, in allusion to the height of them; when a mountain is near, as that called Saokes[l], and having, not far from its top, rough and cavernous places capable of receiving an immense quantity of rain water. They indeed say that others are subterraneous fountains for manifest reasons. There are also, in a great many parts of the earth, veins

[h] Strabo gives an account of this, lib. xvi. Geograph.

[i] There was a place of this name on the southern part of the Euxine Sea, near Diospolis.

[k] They are in Greek called Πηγαι. Varro was of opinion that the Latin word *fons* was derived from *fundo*.

[l] A mountain in Samothrace.

veins containing water; for as they say, in relation to animated bodies, that the whole frame contains veins and is pervaded by numerous arteries, so likewise there are in the earth open places full of air and containing veins of water; in some situations truly very frequent, and intermixed with each other; in some more rare, which persons digging wells perpetually meet with, on account of their number and frequency. The springing veins are likewise called fountains, because they are permanent and conveyed from a distance, and receiving a supply of water one from another.

The waters that are collected from showers of rain, and standing in confined and shady situations, as if in vessels, and having no veins flowing from them, are called ponds[m], so that they are not permanent, but speedily become deficient, unless it happens that they are immensely large. But fountains increase and decrease according to the state of the air; and when a drought indeed happens, the fountains even become deficient; but when the season is wet they increase, for they receive a supply, as it has been already said, from rain water. Fountains likewise generally increase about the winter solstice, when the sun is not equally powerful and the rain increasing; but at

[m] Αβαδες, so called from the defectiveness of their supply.

at the summer solstice, and at the rising of the Dog-star, the contrary effect takes place. You must distinguish fountains and ponds, when they are found, by some method like this: for a fountain, when found, flows from a generous vein; at first indeed gentle, but gradually increasing, and when it is increased to a certain degree, it remains the same; or it flows entirely as it did when it was first found, unless it ceases on account of the state of the air. But they do not say that ponds run in the same manner; for they at first flow forcibly and copiously, and after a short time they cease. They therefore permit no confidence to be placed in such an appearance as this; but they order the persons employed in finding water, first of all indeed to try and examine the places where they are engaged, toward what part of the heavens they are situated, and of what kind they are, observing the usual indications, and what things lead to discovery, and other symptoms from the soil and from its produce; for they say that the reeds springing up, which some call holosschoinoi[n], and butimus, and brambles, and cyperus, which some call zerna, and indeed much-thriving agrostis[o], and the reeds denominated

[n] Described by Theophrastus H. P. iv. 13.

[o] Matth. iv. 28. In French, *dent de chien.*

nated indian, and by some mestokalamoi, by some the bowman's reeds, and the pipe reeds growing thick[p] and delicate, are indications that a place contains water; and the ivy likewise growing vigorously, which some call malakokissos[q], and the wild fig, and the willow, and the Argive elm, and the hippuris, and quinquefolium[r], and batrachion, which they call chrysanthemum; and universally if the things that grow (not such as are planted) are of spontaneous production, green, and flourishing, and numerous, they are signs that nourishment is derived to them from water: you must therefore give credit to such signs, and dig, descending lower from these indications, if the place has a supply from which you are to obtain exuberant fountains. The hippuris took its name from etymology, for it resembles a horse's tail, having leaves like the hair, and the stem growing taper from the root to the top; and the stem itself indeed is smooth like a reed, having distinct joints, from which joints, leaves in appearance like hair arise; and from analogy it is likewise called salpingion[s]. The

[p] *i. e.* frequent.

[q] So called from the delicacy of its texture. Matth. iv. 140.

[r] Matth. iv. 38. Πενταφυλλον.

[s] Because it resembled the form of a trumpet.

The butimus grows in marshy places, and it produces leaves like those of the leirion, and oxen eat them with avidity; and they grow from one root, not singly, but dispersed. The quinquefolium produces from one root many small shoots, about nine inches long, on which the seed grows; and it has leaves like those of mint, five on each pedicle, and seldom or never more, serrated all round, but a pale flower. The batrachium[t], or chrysanthemum, produces leaves like parsley, but larger, a flower of a golden colour, and the whole plant does not exceed two palms. The malakokissos is like the ivy; it has tender leaves, and its stem is covered all around, because it cannot support itself; and it grows principally in reed-plantations, and in deep places. Cyperus, which some call zerna, has leaves like the leek, small when they first appear, and a slender stem like that of the rush; and on the top lies the seed, like the seed of millet: its black root resembles the stones of the olive, having an aromatic taste. When we overlook the indications of these shoots and plants already mentioned, we shall vainly use our endeavours in situations that have no water, either derived from some other source, or fountain, or well-water; but where these plants appear,

 they

[t] Matth. ii. 171.

they are indications that there is water under the surface; and the more withered they seem in appearance, they are a sign that the water near the surface is not much in respect of quantity, and it is not permanent; but the more luxuriant and the greener they are, they are always certain signs that the water is very deep and permanent. It is expedient also to examine the kinds of soil, for those of the potter's clay, and of the pumice-stone, and such as are squalid, universally proclaim that there is no water; but you are not to draw certain conclusions from those which are glutinous, and of a yellowish hue, and from a clay soil, and from such kinds as are of a black colour and rich, and having strata of pebbles: the strata of pebbles ought not indeed to be lying irregularly in the earth, but horizontally; and in general the kinds of soil of different colours ought to have the strata incrustated and thick: and the beds of earth commonly consist of strata of dissimilar sorts. The stones indeed that are about places which seem to contain water ought to be of a dark colour underneath, not perfectly solid, but in some degree porous; and such as are of a light colour, but lying in a soil such as we have mentioned, have water in the earth under them. Any indeed of the

fore-

forementioned productions are signs there is water; and dissimilar strata of stones have water under them, if they are lying in the situation already mentioned. In ground then abounding with pebbles, and in that which is of a black colour and dense, and likewise that which is adhesive, there must be many ponds on the surface; it is therefore proper to dig drains in such grounds, following the course of the water; for thus plenty of water may be collected. In situations indeed that are of a loose texture and stony, if springs be found, you must be satisfied with them when found.

A person trying for water must also use some method like this: let him have a leaden vessel ready, in the form of a hemisphere, that will hold a congius, and let him take two or three locks of wool well washed and combed; let him tie it in the middle with a thread; and let him fasten the thread with wax to the bottom of the vessel in the inside; but let the vessel be anointed with oil; and in a place where a person may take for granted there is water, forming a conjecture from certain indications, he must dig a hole three cubits deep, and let him set the vessel inverted in the hole; and having laid on some leaves of green reeds or any other plants, he is to replace

the earth to the depth of a cubit. He is to do this when the sun is setting; and having removed the earth in the morning, and having taken away the herbage with caution, he is to turn up the vessel, and to examine it; for if there are fountains[v], you will find the wool quite moistened and the vessel full of bubbles of air; and you will know the quality of the water, having tasted it when it is squeezed out of the wool. You will indeed find what is pressed out of the wool of a better flavour than that of the fountain, because the most subtile and lightest particles have exhaled. Enough has certainly been said concerning the finding of water.

VII.—CONCERNING WATER, AND HOW RAIN-WATER OUGHT TO BE COLLECTED.

You must indeed bestow attention on water above all things, not only on account of the pleasure of having good water, but likewise for the reason that it renders the air very salubrious in dry seasons: it is therefore truly fortunate to be able to have fountain water; but if you have not it, let rain water be collected, what is sufficient for your own and the family's use, not, as some

[v] This transition is according to the original.

[illegible] have been accustomed to have it, from [illegible]-cotes, where sheep and other animals fill the cisterns with their dung, but from edifices which must be carefully and continually kept clean; and you are to collect pure water in reservoirs through wooden pipes. Laurel[u] macerated in water renders it salubrious; and we are to cure bad water thus: let it be put into vessels, and let it remain in the open air until it has settled, and let it be gently removed into other vessels without the sediment at the bottom.

VIII.—IN EXTENSIVE GROUNDS THERE OUGHT TO BE EMINENCES THAT ARE WOODED; AND HOW THEY ARE TO BE PLANTED.

It is certainly an advantage to have in a ground the convenience of an eminence that is naturally covered with a wood; but if this do not happen, it is not a difficult matter to raise plantations on such eminences; for there are seeds of trees that are wild, which being sown will become a plantation, but not so easily in dry situations; for willows and tamarisks, and poplars and firs[v], and

[u] Daphne.

[v] Some have imagined that ἐλαται ought to be κληθραι, *i. e.* alders, in this place.

and ash-trees and elms, and all trees of a similar kind, thrive in moist situations; and the pine flourishes in sandy places. Experience has indeed taught us that pomegranates and olives alone thrive prosperously in more dry situations; but let oaks and chesnuts, which are called Jupiter's glandiferous trees, be planted in situations that receive plenty of rain water.

IX.—WHAT LAND IS BEST.

The best land is that, the soil of which is of a black colour, recommended above all, for it is proof against wet and drought. The next is that of a yellowish[*] hue, and that which is thrown up by rivers, on which they bestow the epithet miry, and that which is sweet, and that which feels warm; for these kinds are known to be adapted to vines and trees, and to the propagation of corn. A deep soil is also recommended, especially if it is friable and not hard to work, and not calculated to the production of trees only; but a red mould is very good for other things, it is not however fit for the production of trees.

[*] Of the colour of fire, according to the Greek.

X.—CONCERNING THE PROVING OF THE SOIL.

The proving of the best soil might indeed be d[illegible] from a sight of it; that is, if in time of drought it is not too much crumbled, or, when impetuous showers fall, it is not too miry, but receives all the rain-water into it; and if, when it is cold weather, the surface of it do not appear[y] too hard, for this may generally be proved to be good. The ancients indeed formed another very useful method of proving what falls under the inspection of the eye; for if the trees that grow naturally in the soil are large and numerous, it may be pronounced to be of the most perfect kind; and if of a middling size, it is not above mediocrity; and if it produces thorns and shoots that are small, and grass that is short, it has no strength, and it is not of much value: others indeed, not satisfied with the discernment of the eye, have found out this kind of experiment from tasting[z]; having dug to some depth, they take out some of the mould, and they judge of that which

[y] Resembling a shell, according to the original.

[z] Εκ γευσεως. I have translated this according to the Greek. One might think the word ought to be οσφρησεως.

is of a superior quality from the sense of smelling: but, when not satisfied with this method, having thrown it into a vessel and poured some clean water over it, they transfer the experiment to the real sense of tasting; for as the water proves to be, after it is mixed, such will be the quality of the soil. You must then be quite satisfied with the depth of a foot in corn grounds, but of three feet in vineyards, of four feet where trees are planted. Some judge that a soil is good from the *holoschœnoi*, or from the aquatile reed, or from the bramble; for persons who are in quest of water, likewise give credit to these; but the most accurate proof is taste; and, according to the opinion of the ancients, you must give up the soil that is brackish: for as we avoid having salt in compost, and men of experience advise to pour amurca, that is made of olives, that are not sprinkled with salt, over the roots of trees, and to irrigate dunghills with pure, and not with water that is brackish, it is evident that they disapprove of a soil of that taste, as improper to produce any thing except palm-trees, which it bears of the best growth and the most fruitful: and for this reason the palm tree alone is fruitful in our situations[a], because all of them consist of land of this kind. You must therefore

[a] In Phœnicia.

therefore plant palm-trees only in a soil of a brackish taste, or consign it to execration, or do every thing in your power to cure it, using a mixture of virgin[b] earth as dung; but you must avoid a soil of an unsavoury smell, which is useless in every respect.

XI.—ANOTHER METHOD CONCERNING THE PROVING OF THE SOIL.

Others indeed prove the best soil thus: having made a trench[c] and removed a good portion of the soil, they afterwards throw the mould into the trench again; and if indeed the mould that is thrown in fills the trench, or if it is redundant, they judge that the soil is very good; but if the trench be not filled with the mould that is thrown in, they pronounce that the soil is not good.

XII.—WHAT SEEDS YOU MUST SOW IN A DEEP SOIL, AND WHAT IN A MIDDLING ONE, AND WHAT IN A THINNER SOIL.

It is indeed better to sow wheat in deep land and in champagne ground, but barley in that which

[b] Literally, sweet.

[c] See Virgil, Geor. ii. 230. Col. ii. 2, 19. Pallad. i. 5, 3.

which is middling, and pulse in a thinner soil: you may truly sow pulse also in champagne ground, at a future period, after the wheat harvest; for when thus sown, they having but slender roots, refresh and lighten the soil, the chiche peas being an exception.

XIII.—THE KINDS OF SEEDS THAT YOU MUST SOW, WHERE THE SOIL IS WET, AND IN DRY GROUND.

You ought indeed to sow barley in ground that is not wet, but in such as is quite dry; and you are to sow wheat in a clayey and in a moist soil, for it will yield a greater increase in such a soil; but you must not procrastinate your wheat sowing: you must also plant beans and peas in clayey ground, for they are hurt in dry ground before they spring up, and they perish; and they which do not die, grow degenerate: other sorts of pulse indeed sown in dry ground bear it, but they become better and more generous when sown in a ground that is well watered.

XIV.—CONCERNING THE SEASON FOR SOWING WHEAT AND BARLEY.

Early sowing of all seeds is best; but you must by all means take a soil that is deep first, if it is exposed to air, which affords but little moisture. Now some are of opinion that it is proper to sow from autumn through all the winter, in cold situations, to the ides of March, and even to the vernal equinox, that is, to the eighth of the calends of April. Some persons indeed being more diligent have thus distinguished the periods for sowing, so that they deem it proper to begin sowing barley from the autumnal equinox, which is toward[d] the eighth of the calends of October; and wheat from the setting of the Pleiades, which is toward the third of the ides of November; and Quintilius indeed approves of this. But you must finish the sowing of each of these at the winter solstice, which is toward the ninth of the calends of January. But Democritus, transmitting some physical reason for our observation, advises persons to sow chiefly about the setting of Stephanos[e]; for not only many showers usually fall

[d] Before, according to the Greek.

[e] By the Romans called *Corona*.

fall at that time, but the ground has a certain natural power of promoting the growth of the seeds that are then sown. The setting of Stephanos begins commonly in places in Phœnicia, on the seventh of the calends of December. But the sower must avoid weather that is extremely cold, and winds that are excessively bleak; for it is well known that the ground is then compressed, and as it were rejecting with horror the reception of seed; but in favourable weather, that is, when the south winds or other warm winds blow, the earth kindly receives the seeds and disposes them to take root, and causes them to bear plentifully. Some indeed advise to sow when the moon is increasing from the fourth day to the full moon, that is, to the fifteenth day. Some persons judging it to be more safe, do not sow all their early crop at once, but they divide the sowing of it into a second, a third, and a fourth period, aware of the uncertainty of a future season.

XV.—THE WAY TO KNOW WHICH SEEDS WILL GROW WITH VIGOUR.

Some persons thus learn beforehand what seeds will come to a prosperous growth: they sow,

sow, by way of experiment, a small quantity of every seed in some place, a few days before the rising of the Dog-star. When the Dog-star afterwards rises, it hurts some of the seeds that are sown, it is probable, and some it by no means injures: observing therefore this criterion, they sow them which remain unhurt at its rising, and they leave them which are scorched. The rising[f] of the Dog-star is on the nineteenth of the month of July. We must then water the seeds that are sown for the sake of experiment, twenty or thirty days before, that they may grow.

XVI.—CONCERNING THE CHOICE OF SEEDS, AND WHAT THE QUALITY OF THE SEEDS THAT ARE CONSIGNED TO THE EARTH, AND THEIR AGE, OUGHT TO BE.

We must choose the wheat for sowing of a good kind, full, firm, and smooth, and resembling gold in colour, and which will yield most flour; but this is proved from the baking of the bread. We must indeed avoid that which is injured and wrinkled. We are also to choose our barley, full and

[f] Zoroaster here varies from Diophanes and the Quintilii in book i. chap. 8 and 9. Difference of situation may account for this variation.

and firm, fresh and of a resplendent hue[g], very heavy likewise, and not injured. All pulse also ought to resemble in quality the kinds of grain already mentioned: some persons indeed choosing the largest ears, such as consist of a full and perfect grain, reserve them for the sowing season, being likely to receive a better crop from them. The best seed certainly is that which is a year old; that which is two years old is inferior, but that which is three years old is very bad; that indeed which is older, is not productive.

XVII.—YOU MUST SOW SEEDS FROM SITUATIONS THAT ARE CONTRARY, IN SITUATIONS THAT ARE DIFFERENT.

SOME say that it is conducive to a good crop to sow seeds in situations that are of opposite qualities, as from elevated in champagne situations, from wet in such as are dry, and *vice versâ*; for seeds[h] as well as the soil love change, but so that we are to transfer them from worse situations into such as are better, but not from those that are better into such as are worse.

XVIII.

[g] The Greek implies it was to be of a light colour also.
[h] See Pliny, xviii. 24.

XVIII.—THAT THE SEEDS THAT ARE TO BE SOWN MAY NOT BE BY ANY MEANS INJURED AFTER SOWING.

Sow your seeds, having macerated them in the juice of the sempervivum[1], for thus they will not be hurt by birds, or by mice, or by ants, and when sown they improve: and if you sow a little wheat on the outside, all around, having mixed it with hellebore, the seeds that are sown will not be injured by birds: and if you throw some river crabs into water, that is, those which are called *pagouroi*, and let them remain in it during eight days, and besprinkle the outside of your ground that is sown with this water, the seeds and plants will not be injured by birds. If you bruise the leaves of the cypress, and mix them with your seeds, they will be preserved inviolate. Some persons indeed having besprinkled the horn of a stag or of an elephant, when it is dry, and some having macerated it in water, irrigate their seeds. Apuleius also says, that the seeds that are sprinkled with wine will be less unhealthy; and if you irrigate them with water and amurca, you will do what will be of very great service to

them;

[1] The house-leek; in French, *joubarbe*. Math. iv. 84, &c.

them; but it is better to use physical means; for if the seeds to be sown be put into the measure, in which the seed is measured, and be covered with the skin of a hyæna for some days, receiving physical power and odour from the animal, they will not be easily injured; and if, after sowing and covering the seeds, you mix a little wheat with hellebore and sow it near, whatever birds taste it will die; then taking the birds that are dead, and fixing reeds, hang them by their feet, and no bird will afterward make his approach. If indeed you pound the roots of the wild cucumber, and having macerated them a whole day and a night, you assiduously sprinkle the water over the seeds that are to be sown, covering them afterward with a garment, you may sow them the following day; and when sown, they will not be injured, but they will improve. Vetches will not be devoured, if you mix a little seed of fenugreek with them when they are sown. Virgil recommends to sprinkle the seeds that are sown with nitre[k] and water. The seeds that are sown at the full moon remain uneaten. Apuleius indeed says, that having before the digging of your ground carried round it a toad, you are to confine it in an earthen vessel, and to bury it in

the

[k] Georg. i. 193.

the middle of your corn ground; and at the time of sowing it you must dig up the vessel, and throw it out of the ground, that the crop may not be of an unsavoury[l] taste. The same Apuleius says, that you are to use a few lentils, to be mixed with the seeds that are sown, for they are by nature unfavourable to boisterous winds; and having dissolved some canine fæces in stale urine, and having besprinkled your corn, or trees, or vines, you will keep them all sound.

XIX.—WHAT MUST BE DONE, AND WHAT MUST NOT BE DONE, THAT SEEDS MAY BE FERTILE.

INSCRIBE on your plough[m] what is usual on such occasions, when you turn up your ground afresh, and when you sow it, and the ground will be fertile. They say indeed that it contributes to fertility, to sow your seeds in situations that are different; as, from such as are elevated, in those that are plain, and invertedly. Some persons indeed, for the sake of promoting fertility, sow them when mixed with the dung of the feathered

[l] Literally, bitter.

[m] The inscription, according to the opinion of commentators, was fabricated from פרי אל *i. e.* the fruits of God.

thered tribe, especially with that of pigeons; but you must hold this in detestation in dry situations, lest your seeds be burnt. The sower ought to take care that the seeds may not fall on the oxen's horns; for some call these Kerasbola, and they say that these become steril and imperfect, nor are they to be affected by the power of fire. Seed will be plentifully diffused, if a sieve be made of a wolf's skin, having thirty holes, of a size through which men's fingers may pass.

XX.—HOW YOU OUGHT TO COMPREHEND IF THE SEEDS THAT ARE SOWN ARE IN DUE PROPORTION.

Having expanded your fingers, make an impression on the ground; then withdraw your hand, observe the number of seeds in the impression: for there ought indeed to be seven of wheat at most, and the least number five; nine, and seven, of barley; six, and four, of beans: and a number between these limits will evidently be a due proportion. But in ground that is subject to much[a] snow, you must sow more abundantly, because some of the seeds perish by the frost.

XXI.

[a] Perpetual, in the Greek.

XXI.—CONCERNING MANURE.

Manure makes good land better, and it will is of greater service to that which is bad; but that which is naturally good does not want much manure; that which is of a middling quality, a little more; and that which is thin and weak, a great deal. Lay not your manure in heaps, but dispersedly. Land that is not manured becomes stiff; when too abundantly manured, it is scorched. The person indeed who manures plants, must not throw the compost on the roots, but he must first apply a sufficient quantity of earth moderately, then the compost; and afterward he must again cover this with earth; for thus the plants will not be burnt, when the compost is applied to them, nor will the heat evaporate, which it would do if it was not covered with earth. The dung of all birds indeed is good, that of geese and of aquatic birds excepted, on account of its moisture; and this, mixed with other kinds, will be useful. The dung of pigeons, possessing much heat, is much preferable to all; on which account some scatter it thinly with the seed, without any preparation, but leaving it as it is; for it is useful to an im-

potent soil, cherishing it and rendering it more powerful for the producing and the cherishing of seeds; and it is destruction to the agrostis. After that of pigeons come the human fæces, having some resemblance to the other, and it is particularly destructive to all weeds; and they prepare it in Arabia in this manner: having sufficiently dried it, they then macerate it in water, and they dry it again: and they are firmly of opinion that it is the most adapted to vines: and it is the better on account of the detestable filthiness of the thing, that it may, by a mixture of it, render the odour of other kinds of manure less offensive. The third is asses dung, being of a very fertile nature, and peculiarly useful to all plants. The fourth is goats dung, being of a very pungent quality; and that of sheep is the next in the scale, being of a more mild nature. After this is ox dung; but the dung of hogs being of superior goodness, is improper for corn fields, on account of its abundant heat, for it instantly burns corn grounds. That which is least expansive, and inferior to all the others, is the dung of horses and of mules by itself; but when mixed with kinds that are more pungent, it becomes useful. It becomes husbandmen indeed to observe particularly, that they do not use compost

made

made the same year, for this is really of no use, but it is hurtful, and it produces many venomous[o] animals. That which is three or four years old is very good, for in process of time it has exhaled what was of a disagreeable smell; and if there is any thing that is indigested, it is rendered mellow. We have in another place given sufficient advice that you are not to manure your grounds when the moon is increasing, lest it cooperate toward the production of many weeds.

XXII.—PREPARATION OF MANURE.

Some persons having dug a deep trench, bring all their best and worst dung into it, and let it putrify. They also throw over it ashes from ovens, and dirt, and the dung of all animals, and human fæces in preference to all others; and they pour in human urine, which is a very good thing, and when applied by itself particularly useful to all plants, and especially to vines. They likewise throw over it the filth from curriers yards. Many indeed, gathering[p] the stubble after harvest, lay it under their cattle, that, when it is trodden down and rendered putrid with their urine,

[o] *Ingia* sometimes mean serpents.

[p] Plucking up by the roots, in the Greek.

urine, it may be converted into manure; and they throw it into the trenches with all the things already mentioned. If there is also any dirt, or ashes from chaff, or from thorns, or from wood or from underwood, they likewise throw these in; and having diligently washed the weeds that are thrown up by the sea with fresh water, they mix them together; and after mixing all the things already mentioned, in the trenches, they pour in some fresh water, that they may all putrify together the more expeditiously. They afterward stir them with poles, until they are all mixed together and united, and they become succulent compost: but it is of the greatest utility, if we transfer the rain-water from the roads into our repository for manure; for this muddy and turbid water will increase the manure that is thus laid, and it will improve it by adding much to its state of putrefaction.

XXIII.—THE TIME WHEN YOU MUST BRING EVERY KIND OF LAND INTO TILLAGE.

THE method[q] of bringing every kind of ground into tillage is not the same; but that which is condensed,

[q] Εξημερωσις. The word seems to me to signify the act of bringing land that was wild into a state of tillage.

condensed, and having numerous roots standing thick, is dug to some depth with instruments adapted to the place, when the weather is very dry; for the ground becomes more friable, and the roots are dried by the excessive heat of the sun, so that they have not the power to take root again; and ground that is deep, and that which is of a firm texture and heavy, and that which is rich, being turned in the same manner in dry weather, are not less benefited; but light ground being burnt by the sun, is reduced to ashes, and all the goodness of it exhales by the scorching heat of the sun: you must therefore work this kind of ground about the autumnal equinox, not with spades nor with digging instruments, but with the plough; and you must immediately manure it, for plenty of manure is of the utmost assistance to it. In Arabia, however, they avoid the tilling of light land, as having but little strength, and becoming rarefied by tillage it is deprived of its moisture; but having first sown barley in *gordat*[r], in their language, it frequently becomes fruitful, especially when there are many showers. You will in the same manner as you

[r] جُرْدَة in Arabic signifies nakedness among other things, from the verb جَرَدَ. It seems here to be applied to the poverty of the soil.

have done your light land, work that during the winter, which is of a yellowish colour, and that which is of a red hue, and sandy ground, and that which is black; and the white, and the dry, and the light; and that consisting of white potters clay, and such as is situated on hills. Having stirred land that is brackish with small ploughs in the beginning of winter, when it has rained, you will scatter some refuse of straw over it, which is indeed better than bean-halm, for it is allowed to be so; and you will do it afterward with barley and wheat straw: for when they are rotten, the brackish soil being reclaimed and sweetened, no longer sends up that brackish moisture, as it used to do. Having then let it remain during a whole year, you will manure it in autumn with ox and horse dung, which are of a sweeter quality. You will then sow it with barley and pulse that have not deep roots. But work land in mountainous and exposed situations, and in such as are much shaded, and toward the north, during the summer, in hot weather, in the same manner as deep land, which we have already said to be better to be wrought with spades: but if working with spades do not seem sufficiently expeditious in a large portion of land that is to be sown, it is in our power to plough

plough it during the summer, beginning in the evening, and continuing all night till the rising of the sun, that the moisture and richness being shaded may remain in the soil; and that the oxen, suffering from the heat of the sun, may not contract disease, and that they may work cheerfully, the soil being rendered in some measure mellow from this nocturnal tillage. The ploughman must indeed yoke, not two, but four oxen; and he must make what is called a double yoke, and he must double and treble it; and he must use a weightier share; that thus the richness of the soil may be wrought sufficiently deep, and that the ground may be properly turned.

XXIV.—CONCERNING WEEDING* WITH INSTRUMENTS, AND HAND-WEEDING, AFTER SOWING.

It is the best method indeed to dig round the grounds that are sown by human aid, that all the seeds may be properly covered; but if it cannot be done, let them be harrowed by means of oxen; and when the crop begins to cover the ground, let it be weeded with instruments, that the weeds may

* Σκαλια means the act of clearing the ground and covering the seeds with what the Romans called *sarculus*.

may disappear, and that the roots deprived of their moisture may be laid in heaps; and if it is twice weeded, the utility will be double. When it comes into ear, let it be hand-weeded[t], for then the produce will be clean and of great value, the[u] soil cheerfully contributing to support it.

XXV.—AT WHAT TIME YOU ARE TO REAP.

When some parts of your corn ground begin to grow yellow, reap all, and especially your barley: but you must reap your pulse much earlier, for they will boil much better, and they will be sweeter; you need not therefore wait till they are all ripe, for if any one thus waits he will lose that which became ripe first, for it will fall off when it is reaped. Drier corn is indeed fitter for keeping, but it is less in quantity; but that which is of a yellowish hue is sweeter for eating, and the chaff from it is more grateful to the cattle. It is proper to collect all your crop early in the morning, when the dew is upon it. Wheat indeed and barley, that are winnowed, [illegible] must [illegible]

[t] This was expressed by the word βοτανιζεσθαι.

[u] In some copies thus: "The soil not loving to cherish weeds."

must be left on the threshing-floor a day or two, or a whole night; and it is proper to remove them before the rising of the sun, that the grain may be deposited in the granary when cool, for this greatly contributes to its keeping.

XXVI.—CONCERNING THE LAYING OF THE THRESHING FLOOR.

It is proper to make the threshing-floor on an eminence, that it may readily receive the wind; and you ought above all things to take care not to build the threshing-floor exposed to the wind near buildings or gardens; for the winds blowing the minute particles of the chaff unobserved into men's eyes, injure[v] the pupils, so that many persons have been deprived of one eye, others indeed of both. The chaff is also hurtful to fruit-trees, and especially to vines; for as manure, so is chaff indeed applied to the roots: but it is very hurtful to the branches and to the leaves; and it is not less injurious to pot-herbs, for when it rests on them it perforates the leaves, and these, when perforated, wither[w]. It is of utility to sprinkle amurca

[v] Inflame, according to the original.

[w] Are burnt, is the Greek expression.

amurca over the threshing-floor from time to time, and to level it with a cylinder, for then ants will not injure it. Let the grain that is laid on the threshing-floor be exposed[x] to the south; for it will be fuller, and it will be wrought out with more ease.

XXVII.—CONCERNING THE GRANARY, AND THE CARE AND PRESERVATION OF CORN.

CORN is properly kept in lofty granaries having light from the east; and let the place have a moderate portion of air from the north and from the west, and let it be turned from the south and from such winds: let it also have a number of air-tubes, through which the warm air may exhale, and that which is cool may enter: but let it not be exposed to moisture, or to any unsavoury smell, or to disagreeable stench; and let it particularly be at a distance from stables, and from ox-stalls, and from every kind of heat. Let the wells be plastered with clay mixed with hair and straw; let them be afterwards covered within and without with that which is called potters clay; and having after this macerated the

x Have its section, in the Greek.

the roots and leaves of the wild cucumber in water during two days, and having wrought that which is called sand mortar with the water, carefully plaster the inside: some likewise mix the mortar with ox-stale, as being destructive to noxious creatures; and they sprinkle urine over the testaceous coat that is laid on the pavement. Some sprinkle ashes of shoots of the oak over the corn; others, dried cow-dung; some lay on dry shoots of absinthium or of abrotanum, and some indeed the dry leaves of the sempervivum. It is better to sprinkle amurca over the sand mortar, for this destroys all noxious animals, and it makes the corn more firm and more dense: some persons therefore, having boiled amurca to half its quantity, sprinkle it over the walls; then suffering it to dry, they lay in their corn. But the best way of all is to prepare dry potters clay, or leaves of the pomegranate dried and sifted; and when the corn is deposited, to sprinkle a chænix[y] of the potters clay, or of the leaves over each medimnus[z] of corn. It is indeed of very great service to strew some conyza on the floor under the corn, and after throwing on ten measures of conyza, then to lay the corn on it till all is

[y] One pint + 15. 705¼ sol. inch.

[z] 4 pecks, 6 pints, 3. 501 sol. inch.

is deposited; for what is thus deposited not only remains during many years in a state of integrity, but it will also preserve the same standard in baking. Corn indeed, when grown old, becomes by its nature of a very dark[a] colour, and of an unsavoury[b] taste, whence it requires the attention prescribed.

XXVIII.—HOW SEED CORN, DEPOSITED IN GRANARIES, INCREASES.

CORN will increase in measure thus: having pounded and mixed some nitre and aphronitre with some light earth, throw them over the corn, and this will preserve it unhurt. Some[c] indeed mix the nitre and aphronitre with vinegar.

XXIX.—THAT ANTS MAY NOT TOUCH SEED CORN.

ANTS do not touch seed corn, if you will circumscribe your store with white earth, or if you lay wild origanum around it.

XXX.

[a] Black, in the Greek.

[b] Bitter, in the Greek.

[c] This passage is not in the MSS. nor in the ancient Latin copy of Cornarius, nor in the Italian translation of Vitelli.

XXX.—CONCERNING THE PERMANENT STATE OF BARLEY; HOW IT MAY BE KEPT HEALTHY IN THE GRANARY DURING A VERY LONG TIME.

Dry leaves of the fertile laurel, and all kinds of ashes, especially from blocks of the laurel, being laid on, will preserve barley unhurt. The plant sempervivum also being dried and mixed with calaminth and gypsum, along with the barley, will preserve it. Some indeed having filled a vessel with vinegar, and having set on a cover, place it in the middle of the barley. It may be proper to know that barley, when grown old, becomes of a bitter taste.

XXXI.—CONCERNING THE PRESERVATION OF MEAL.

Meal remains unhurt for a considerable time, when pieces of gummy trees are prepared and thrown into it. Some persons indeed, pounding cumin and salt in equal quantities, and making dry pellets of them, lay them in the meal.

XXXII. — CONCERNING THE PROVING OF WHEAT, AND HOW A DUE PROPORTION OF BREAD OUGHT TO BE MADE.

HAVING carefully cleaned and winnowed the wheat that is sound, weigh it; and if you find a modius weighing forty pounds, expect the same weight of dough; for what will be diminished by taking away the bran in grinding, the water, that is sprinkled over it in the rest of the process, will add to it. The baking of the bread indeed takes away a tenth[d] and a twentieth part from the standard; so that, in the baking of it, it is diminished a pound and a half in ten pounds. You must indeed take away the same proportion for the baking in the best bread, and in that of the second quality.

XXXIII. — HOW TO MAKE VERY PALATABLE BREAD WITHOUT LEAVEN.

SOME make bread without leaven, making use of nitre, for nitre makes bread as well as meal more fit for digestion. Others indeed make bread without leaven thus: they put some grapes in

water

[d] $10+20=30$ $\frac{30}{2}=15$ $\frac{15}{10}=1\frac{1}{2}$.

water the day before the baking, the day following they take the wet grapes, and press them, and they use the flowing liquor instead of leaven, and they make the bread sweeter and finer. But if you wish to have leaven for a whole year: when the must ferments in the casks, take that part which froths on the surface, and mix it with the flour of millet; and having carefully pounded it and made it into pellets, dry it in the sun, and set it in a moist place, and take what is sufficient of it, and use it instead of leaven. All bread that is made without leaven, is of the greatest efficacy in promoting an exhilarating flow of spirits. Florentinus indeed says that the bread denominated Clibanites[e], made thin, and dried in the sun, is easily digested, but the bread which is baked in ovens is of more heavy digestion.

XXXIV.—CONCERNING PTISANE.

HAVING decorticated the barley, dry it in the sun; and having also pounded it, dry it in the sun; and

[e] *i. e.* baked on the *clibanos*, which was a round utensil for baking, made of metal. Κλιβανος σκευος τι σιδηρουν, εφ ὠ τας τους αρτους οπτουσι πυρ υποκαυσαντες και πυρακτωσαντες αυτον. Cassiodorus says: *Clibanus etiam erat coquendis panibus æneï*

and when you lay it up, sprinkle over it the fine meal that came from it in pounding it, for it will preserve it. Ptisane, taken when it is moist, is very nutritious, it is said by Florentinus.

XXXV.—CONCERNING BEANS.

Do not plant beans near the roots of a tree, lest the tree be dried. But you ought to plant beans late, and they like a clay soil. That they may boil well, sprinkle water with nitre over them. Physicians indeed say that beans make the persons that eat them heavy: they also think that they prevent right dreams, for they are flatulent. They likewise say that domestic fowls that always eat them become barren. Pythagoras also says that you must not eat beans, because there are found in the flower of this plant inauspicious letters. They also say that a bean that has been eroded becomes whole again at the increase of the moon: that it will by no means be boiled in salt water, nor consequently in sea water. Amphiaraus

vasculi deducta rotunditas, quæ sub ardentibus flammis ardet intus. Galen says that this bread was more wholesome, because it was more equally baked than that which was baked in the oven, εν ιπνω.

phiaraus[f] was the first that abstained from beans on account of the foretelling of events by dreams. The following words are likewise ascribed to Orpheus :[g]

> You sons of misery, from beans refrain :
> Your hands a parent's blood as well might stain.

Beans besprinkled with sea water, and when irrigated with water of Magudaris[h], will be preserved unhurt.

XXXVI.—CONCERNING CHICHE PEAS.

If you macerate chiche peas in warm water the day before they are sown, they grow larger ; but some bestowing greater attention on them, wishing to have their chiche peas much larger, sow them, having first macerated them with their integuments in water mixed with nitre. If indeed

 you

[f] Son of Oeclus and Hypermnestra, an Argive, soothsayer and augur. *Cic. de Divin.* 1.

[g] Some have ascribed them to Empedocles. See Athenæus, lib. ii. v. 2. The drift of these verses may be, that the eating of beans is as unfavourable to right dreams as the crime of parricide, which might be unlikely to promote such dreams or undisturbed repose.

[h] Supposed to be the root of Laserpitium.

you wish to have them early, sow them about the time of barley-sowing; and that no person may be able to eat them when ripe, having properly mixed the seeds of the wild cucumber and absinthium with water, besprinkle them during five days early in the morning, for the dew washes away the bitterness in five days more.

XXXVII.—CONCERNING THE LENTIL.

Lentils smeared with cow-dung before they are sown, will grow better and more speedily. The lentil grows larger in the integument, if besprinkled with warm water and nitre when sown. It remains sound when besprinkled with vinegar mixed with the juice of laserpitium. The Egyptian lentil affects the spirits of the persons that eat it.[1]

XXXVIII.—CONCERNING MILLET.

Millet loves a soil that is miry and wet, and sandy ground, if it be frequently watered. A little [illegible] seed

[1] The meaning of this sentence is subject to ambiguity. The Greek is ευθυμιαν παρεχει. The learned say the first word ought to be αθυμιαν, because Galen, Dioscorides and Theophrastus say that the lentil causes dejection of spirits, &c.

seed indeed is sufficient for a whole ground. It likes to be weeded with the sarculus, and to be hand-weeded continually. It is sown from the vernal equinox, which is before the ninth of the calends of April. If it happens to be sown too thick, it will be detrimental to it: for a *plethron*[k] does not take more than a handfull[l] of seed. In weeding, it is proper to take up the weeds with the roots; for a *plethron*, thus managed, will certainly produce forty *modii*.[m]

XXXIX.—CONCERNING LUPINES.

It may be proper to sow lupines before other kinds of pulse, after the autumnal equinox, when the rainy weather is past. Drive in your cows before they are in blossom, for they will feed on every other herb, but they will not touch these on account of their bitter taste. Apuleius indeed says that they are driven[n] about with the sun every day, and they demonstrate the hours of the day to husbandmen, although the air is clouded.

 Lupines,

[k] A measure of about 120 square feet. Plutarch uses it to express the *jugerum*.

[l] *i. e.* a small quantity.

[m] A *modius* contained one peck, 7. 68 sol. inches.

[n] Pliny mentions this, lib. xviii. 36. 67.

Lupines, when sprinkled with sea and river water, during three days are rendered sweet; and when they begin to become sweet, being dried and laid up, they are given with chaff for food to cattle. They are good for making bread, when barley or wheat flour is mixed with them. You must sow lupines in poor ground, and they want no manure, for they are turned into manure because they serve for compost to all poor land, and they render it fertile in future. They blossom indeed thrice°. It is proper to reap them after rain; for when they are dry, they get out of their integuments, and are wasted. When pounded and applied to the navel, they are an antidote against worms. Let them not be sown too deep; and they flourish like the caper, although neglected; but they do not thrive so well, if the ground is too assiduously wrought.

XL.—CONCERNING ALL KINDS OF PULSE, AND CONCERNING HEMP AND FLAX.

Pulse like to be planted in a dry soil, beans excepted, for these love places that are watery and

° About the end of May or beginning of June, about the end of June or beginning of July, the third time in July or August.

and abounding with moisture. Hemp indeed delights in hollow situations, and in such as are always wet. It is sown from the rising of Arcturus, which is before the fourth of the calends of March, to the vernal equinox, which is before the ninth of the calends of April. Flax also likes places that are miry, but it is sown from the autumnal equinox to[p] the day before the nones of January.

XLI.—THAT THE PULSE THAT ARE TO BE SOWN, MAY BOIL WELL.

In sowing them you are to mix nitre with the manure, for thus you will make them fit for boiling; but if, having done this, it do not succeed, and you wish your pulse to boil readily, throw a little mustard into the pot, and the things that are boiling will soon become tender, whether meat or pulse; and if you add more mustard, they will be in a state of solution.

[p] The rising of Arcturus is again mentioned in this place, but it does not seem to me to be accurately fixed; for Pliny says, *Pridie Nonus Januarii Cæsari Delphinus matutino exoritur*, lib. xviii. 26, 64. Ætius corroborates this opinion, iii. 164. As this rising of Arcturus appears to me to be of dubious authority, I have omitted it in the translation.

XLII.—CONCERNING THE LION'S TAIL, WHICH THEY LIKEWISE CALL OROBANCHE.

The osproleon, which some call orobanche, will not grow in grounds, if you fix branches of the rhododaphne at the four corners and in the middle of the field.

This will also preserve all kinds of pulse in safety; and if you wish this plant totally to disappear, take five shells, and describe on them with chalk, or with some other white pigment, Hercules suffocating the lion, and set them at the four corners and in the middle of the ground. There is another physical remedy working by contrary affection, and to which Democritus gives testimony, and says, that when a lion or a wild beast looks attentively at a cock, and he is in a state of consternation, if[q] any person takes the cock and goes round the place, the leonine plant soon gives way, and the pulse improve, as if the plant were intimidated by the cock. Some persons indeed, learned by experience,

[q] According to some MSS. this passage runs thus: "Let a "marriageable virgin, having her body and feet naked, with- "out any the least clothing, with dishevelled hair, go round "the field," &c. &c.

rience, advise to besprinkle the seeds that are to be sown with the blood of the cock, and they will not be hurt by the leonine plant: but some paint this on a shell[r], and place it in the middle of the ground. It is certainly proper to take care that the pulse that are sown may not touch the horn of the ox, for they become barren and of no use.

XLIII.—BY WHAT PLANTS OTHERS ARE INJURED.

The orobanche kills beans and chiche peas by twisting itself round them. Darnel, which is called aira[s], kills wheat; and mixed in the bread, it makes them who eat it blind. Ægilops[t] is hurtful to barley; the plant called pelekinos[u] hurts the lentil.

XLIV.

[r] This passage seems to be imperfect. It probably alludes to Hercules and the Lion.

[s] Probably, from the havock it made.

[t] Wild barley, Matthioli Comm. iv. 134.

[u] The hatchet vetch, Matthioli Comm. p. 342.

XLIV.—CONCERNING THE PERSON WHO HAS THE CARE OF THE FARM, OR THE HUSBANDMAN.

The person who is entrusted with the care of the farm must be an example to all the workmen, that looking up to him, and to his life and morals, they may rather respect than fear him. Let him be honest, hospitable, abstaining as much as possible from wine, for the drinking of too much wine brings on forgetfulness; let him not be too covetous, nor insatiable with respect to usury, but contented with what is moderate, and always supplying the persons that want them with such things as are necessary; vigilant, and apt to get up before the rest of the family; careful not to lie, and particularly so not to swear to what is false; pious, attentive to the customary rites, not treating the consecrated[v] groves, nor any

[v] Consecrated trees, literally. In the ancient Roman writers we read of the consecrated groves; and P. Cato has left us an account of the ceremony to be observed at the cutting down of one of them. Virgil mentions the religious respect which the Greeks had for the oak:

Et habitæ Graiis oracula quercus.

Moses also takes notice of the primitive mode of worshipping in groves, Deut. xii. 2, 3. The Gauls, who transmitted their

any thing of the kind, with contempt, but exhorting all to get ready to the acts of religion; and indeed in time of work let him be attentive, and in time of recreation let him be affable and indulgent, permitting the holidays to be observed every week, and suffering nothing of importance to be done at that time, but compelling the men to rest, and particularly on the monthly and yearly feasts; let him not barter for other men's labour, nor let him receive the profit of his master's ground, nor let him accommodate every person at his master's expence; let him be obedient to his master's commands; and if he finds any thing more adviseable, let him first refer it to his master, unless the utility of the thing so ties him down that he cannot await his master's orders.

XLV.

language and their religious rites to the Britons, derived the former from the East; and in conformity to the construction of the eastern languages, it had no present tense, and it abounded in oriental words, consisting of radical letters. It appears, from this and other passages in the Greek writers, that the worship of the Druids of Britain in groves does not seem to have been indigenous. The following passages in the Scriptures seem to countenance this opinion: Gen. xviii. 1. Gen. xii. 6. Judges, ix. 6. Joshua, xxiv. 26. Hosea, iv. 13. Ezek. vi. 13.

XLV.—THE HUSBANDMAN OUGHT TO HAVE AN EPHEMERIS OF EACH DAY'S WORK; AND HOW IT IS PROPER THAT HE SHOULD ARRANGE THE WORKMEN IN COMPANIES.

Let the husbandman have a diary accurately drawn up for the general perusal of the workmen employed in agriculture, and an account of all the days in every month, that from this he may be able to know and to remember how he ought to go on with the work, no time being lost; for if he omits but one day, he will confound the arrangement of the labour, and he will not only hurt the present crop, but he will render the soil less estimable. If there are indeed many workmen, they must not all work together, for they will with facility combine to work negligently; nor yet two or three, for they will want many persons to preside over them. Let them not work all together nor too few in number, but it is proper to proportion the number and the persons that preside. It is the best way indeed, if there are many, to distribute the workmen into decades*; but if few, into companies of six, and not into companies of five; for when the men that dig are of

* Companies of ten.

of equal number, the consequent labour will be preserved in the same degree of equality; and the men that are more indolent lifting up and laying down in one regular process of raising and depositing, are under the necessity of making themselves equal to those who are more active.

XLVI.—CONCERNING PROPORTION OF LABOUR.

Some have observed, whether in vineyards, or in a plantation of roses, or in a garden, or in any place prepared for a plantation, and dug to the depth of three feet, that seven workmen are sufficient for every plethron*; but in a soil that is very stiff, that eight men are required: and that a plethron also of old vines in ground easy to be wrought, and not abounding with weeds, and on a declivity, is frequently wrought by three men; but in one that is more stiff and full of weeds, by eight workmen: but fresh plantations have been often wrought by three men during the first five years. The Aminean vine is cultivated with more facility, but the Surentine is quite the contrary, for this wants more workmen. Persons that have made the experiment,

* A plethron here seems to be what the Romans called *jugerum*.

experiment, affirm that a plethron may be ablaqueated by four workmen; the ablaqueation[y] being made, the breadth indeed two feet and a half, but the depth a foot: and this has been observed to be the best calculation. It has also been observed that a plethron may be pruned by four men; and that the first pampination[z] is performed by one man, and the second is much less trouble. Moreover all the old writers bear testimony that it is impossible that more than eight plethra of vineyard should be cultivated by one vine-dresser, although a good workman, nor is it to be permitted.

XLVII.—CONCERNING THE HEALTH OF THE LABOURERS.

It certainly would be useful if you also appointed a physician for the use of the farm: but if you do not, you are to cure the diseases incident to the human frame, by making observations on those who have laboured under a similar disease; for they who inhabit the same country, and who partake of the same diet, if they should

y The act of digging round the roots of vines.

z Βλαστολογια, the act of removing the useless shoots.

fall into the same diseases, will likewise be cured by the same remedies. But it is better to prevent the diseases of the workmen, and to anticipate a cure, as much as possible. As the sun is hurtful to the bodies and to the circulation of men who are at work in the heat, and not having some defence against it; it is proper to lessen their allowance of victuals, that they may eat it, not at once nor at two periods, but a little and often; for this is salutary and very favourable to digestion. Some boil rue and wild mallows, and mix wine that is turned with this liquor, and give it them with their victuals. Some indeed mix milk and water, and pour a little sour wine into it, and they give it them before they eat; and they do this from the beginning of the spring till autumn: others give them wormwood wine, and this may be taken not only before, likewise after, and at the time of eating. But if we have not this wine, we are to give them some wormwood, having thrown it into water and boiled it. Squill wine has the same effect. They likewise prepare squill vinegar; and if indeed you are going to give the squill wine, you are to give it before eating; but if squill vinegar, after supper. The marsh wine, that is, what is made in marshy situations, is exeeedingly wholesome, preserving those who use

it

it in good health. Ptisane is also very nutritious, and it is wholesome; and the bread called Clibanites, made thin, and dried in the sun, is very conducive to health: but the bread which is baked in what are called ovens, renders digestion more heavy. If the water also is not good nor fit for drinking, but unwholesome, let it be boiled until the tenth part of it be wasted; let it be cooled, and it will then be innoxious: for thus sea-water also being boiled is rendered sweet. As venomous animals likewise perpetually infest labourers, such as vipers and phalangia[a], and serpents, and the poisonous mures aranei[b], and scorpions[c], although they may be considered as domestic: the labourers must be persuaded that the vine called *theriaca* affords a sufficient remedy against all the attacks of such animals; for not only the wine made from the *theriaca* will assuage the pain of the person that is bit; but vinegar also from it, and its grapes, and the dried grapes,

[a] Now called *tarantulæ,* from Tarentum, in Apulia, where they are numerous. Matthioli Comment. 294.

[b] They are common in Italy; the inhabitants call the animal *topo ragno.* Matth. Comment. 298.

[c] Matthiolus enumerates the different sorts, and prescribes remedies for the bite of these animals. Com. 253 and 1018.

grapes are efficacious; and the ashes of the leaves and of the shoots that are burnt, applied to the bite, will assuage the pain, and will save the patient. The efficacy of the ashes of all the shoots of this vine is so powerful as to cure the bite of a dog, and frequently when he is mad. The power therefore of the theriaca, when applied, demonstrates the efficacy of the remedy. But how the theriaca may be prepared, and the wormwood and squill wine, shall be sufficiently shewn in their proper places.

XLVIII.—IT IS NOT PROPER TO TRANSFER LABOURERS OR PLANTS FROM MORE ELIGIBLE SITUATIONS INTO SUCH AS ARE INFERIOR.

SOME advise not to remove plants and labourers from healthy situations into such as are unhealthy, but rather from worse into such as are better, or similar, or into such as are not much inferior; for a change appears strange, and is disagreeable to persons removed to a worse situation. This is observed by persons of the first discernment, not only in relation to men, but likewise with respect to plants.

XLIX.—IT IS EXPEDIENT TO HAVE SMITHS, AND ARTIFICERS, AND MAKERS OF EARTHEN WARE, ON OR NEAR THE FARM.

It is inconvenient that the workmen should go to towns for the sake of procuring tools; for want of instruments, when perpetually deferred, will be an obstacle to the labourers; and a continual travelling to the city makes a man more idle. It is therefore proper to have smiths and artificers either on the farm, or near it; and it is very necessary to have makers of earthen ware for general use, because it is well known that potters earth is to be found in every ground; for you will find earth fit for the making of potters ware, either on the surface, or under it, or in some recluse parts and situations on a farm.

BOOK III.

HYPOTHESIS.

The following things are in this Book, being indeed the Third, in relation to the choice Precepts of Agriculture, and comprising the Work adapted to each Month.

A DIARY, AND WHAT OUGHT TO BE DONE EVERY MONTH.

I.—IN THE MONTH OF JANUARY.

IN the month of January it is proper to prune the arbusta, avoiding the early and late hours of twilight. In the same month you must cut down timber for building and common use, when the moon is in conjunction[d] and under the earth; for the light of the moon makes timber less hard; but that which is cut down at that time remains sound. In the same month you must manure fruit-bearing trees, but the compost must not touch the roots. You will in the same month insert the trees which blossom first, as the duracina, the damascene[e], the apricot, the almond, the

[d] *i.e.* with the sun.

[e] Commonly called *damson.*

the cherry. In this month you must also prune the vine called *chamitis*[f], with very sharp knives, in fine weather[g]. You must plant vines and other trees from the ides of January, as long as the aptitude of the situation admits the plantation. In this month you must not sow, for the earth being impotent and heavy, becomes vaporous, and it has some resemblance to wool that is ill set out of hand. You are to manure medica, and to cut the green cytisus. Now before manuring, turn with small ploughs, and then immediately manure it, dry, and light, and white land, and such as abounds with hillocks, and that which is thin and sandy, and such as abounds with roots and coarse weeds, which you did not work[h] in the month of October. You must turn up brackish earth with small ploughs, and you must scatter over it some bean-halm; but if you do not do this, some wheat or barley straw.

II.—IN THE MONTH OF FEBRUARY.

In the month of February we are to transplant vines that are well rooted from the nursery, two or

[f] Thus called from its lying on the ground.

[g] Observing serene days and hours (in the Greek).

[h] Renovate, in the Greek idiom.

or three years old, but by no means those of a year old, for they are too weak. The transplanting of vines produces much fruit, and it makes the wine good. In this month we plant the reeds before they begin to bud. In this month it is also expedient to plant the vine and all kinds of trees, and roses, and lilies[i], when the moon is incréasing. In the same month we are to sow trimestrian[k] wheat, and sesamum[l], and hemp; and the land in which we are to sow medica[m], we must now plough a second time.

III.

[i] *Τα κρινα.* It is not impossible but the Greeks distinguished them by this name on account of their superior size and beauty, and because the organs, by which botanists form their arrangement into classes, are so perfect and discernible in them. The French call this plant *le lis*; and contrary to the customary mode of elocution in use among them, that they may give force to the word, they give the last letter its due sound. The word is of Gallic origin, and the Franks thought proper to retain it among an incalculable number of words, which remain to this day in the French language. Its import in the earlier ages of Gaul conveyed distinction of a superior kind, and it was expressed with little variation from what I have already mentioned, signifiying, by way of eminence, *the plant.*

[k] So called because it came to full growth in three months.

[l] In English, the oily grain.

[m] Lucerne.

III.—IN THE MONTH OF MARCH.

In the month of March, we are to select shoots for grafting, and we are to graft vines and other trees. In this month we must plant reeds before the equinox. In this month we are to take care of the olive trees that want assistance[a]. In this month we are to lay hogs dung to the roots of the almond trees, for it makes those[b] that are of a bitter taste, sweet, and larger, and delicate, as Aristotle says. Theophrastus indeed says that you are to pour urine over their roots. This month we are to plant all kinds of trees from truncheons, especially in cooler and more wet situations. This month we ought to dig round the roots of the vines and other trees, for such as are then dug bear abundantly, and good fruit. This month it is proper to remove the buds of the vines that are three years old, as the buds are yet tender. Some indeed remove the buds with their hands; for it is an opinion of the ancients, that you are not to apply an iron instrument to the vines before they are three years old. The laying down also of vines three years old, is more convenient

[a] Healing, according to the Greek.

[b] This word alludes to the fruit of the almond trees.

venient in this month. The persons that graft in this month, ought to do it before the trees bud, when they seem to have a greater share of moisture, and to be careful that the shoots taken for grafting of apples and pears may be taken off with a very sharp knife, with caution and exactness; for the bark of these trees is tender, therefore some remove them with their hands rather than cut them with the pruning-knife. Persons that prepare the ground for seed, ought also to plough it, that it may be refreshed, for being then turned it will not cherish many weeds, and it will become more friable. It is not sufficient to do this once, but it must be done a second and a third time. It is proper indeed to sow the white wheat denominated *sitanion*[p], and the black wheat, and the oblong called the Alexandrian wheat, in light land, and well exposed to the sun, and in elevated ground, and in such as is accomodated with trenches, and in sandy and dry land, to the day before the ninth of the calends of April. You are to sow what is called the small barley, in land that has produced a crop of wheat. You are to sow sesasum, typha,

[p] Galen says this was trimestrian wheat. See Theop. *de plantis*, l. viii. c. 2; and Dioscorides, l. ii. c. 107.

typha[q], spelt, millet and hemp, in situations near the house. When the things that are sown run to stem, weed them, for then the produce will be clean and exuberant. Cut your green cytisus also.

IV.—IN THE MONTH OF APRIL.

In the month of April, olives may still be planted, and it is particularly proper to dress[r] them at this time, for when they are thoroughly dressed they produce better fruit. Theophrastus indeed says that cuttings of olives and of pomegranates and myrtles may be planted this month in wet and irrigated situations. This month we are to graft and to inoculate olives and other trees in good time. At this season also the fig, and the chesnut, and the cherry, begin to be inoculated[s]. But the second digging of young vines ought to be completed this month; and it is also proper to prune the new vines, for the incision that

[q] A reed that is common in Italy. The Tuscans call it *mazza sorda*; for they are of opinion that, if the *lanugo* which it produces falls into the ears, it makes a person deaf. The Spanish name of this plant is *Bohordo.*

[r] Καθαιρειν signifies here, to remove the useless roots.

[s] Ενοφθαλμιζεσθαι.

that is now made will be smoother; although it is the opinion of some, and especially of all the ancients, that you are not to apply the knife to the vine before three years. This month it is proper to gather the seed of the elm[t], and to sow it immediately. The fig trees also which have good roots may be transplanted, although they are now shooting.

V.—IN THE MONTH OF MAY.

In the month of May it seems to be most exceedingly proper to graft the vine before it buds. Some graft it after the vintage. This month we are to dress the olive trees; in the same month we are to rack our wines into other vessels; and it is proper to fill the jars within a little distance of the neck, that it may not burst, but that it may have vent[v]. This month, as it has been already said, the vine may be grafted, even when the stem begins to shoot, for there is a viscous gum; but having taken the grafts a considerable time before they budded, and having carefully laid them under-ground, or in an earthen vessel, we

[t] The witch elm is propagated from seed about this season.

[v] The metaphor in the original is thus expressed: "that it may not be suffocated, but that it may have respiration."

we are to preserve them so that they may not germinate. This month it is proper to dig the vines, and especially when there is a drought; for digging animates the thirsty vine, for it makes it perspire, and the earth being laid on the roots refreshes the parching tree. It is likewise necessary to dig the nurseries. The nurseries are the plantations from which we take our plants, and transplant them into other places after two or three years. This month it is proper to irrigate the trees that are grafted, every evening, with water from a spunge. Some persons also plant trees this month in exposed situations, and in such as are very cold and very wet, or in such as may be irrigated; and they do this not only during all the month, but to the ides of June also; as it is manifest that every plant, before it swells into a bud, is to be taken for cultivation, for nothing that has once budded will have the power to shoot, except the fig only; although some plant vines after they have budded. This month also it is proper to dig lupines that have been sown for the sake of manuring or meliorating the ground; then to cut them before the ides, before the grape blossoms, when they are wet; and to suffer them, when out, to rot, and afterwards to plough them, until the lupines that are cut are buried; and thus all the roots are destroyed.

stroyed. The same month also we are to turn the ground that is infested with much agrostis[u] and we are to suffer all the agrostis that is eradicated to dry; and when the moon is sixteen days old, we are to carry it all in parcels out of the ground, and what is termed antipathy prevents the possibility of its reviving. It is proper also to rub and clean the vessels into which the wine is racked from the casks, with *spartum*[w], for there will be neither much defecation, nor will it dry, if there is, which is consummately hurtful to wines.

VI.—IN THE MONTH OF JUNE.

In the month of June it is right to dig round the vines that have been grafted, before the ides, if it be possible, a second and a third time, having begun before the ides of May. Let all the pampination be also finished this month. We are now likewise to remove the prominent shoots; and if there be any excrescence

in

[u] See Book ii. c 6.

[w] A kind of broom, the various uses of which Pliny mentions, lib. 19. c. 2. It is specifically distinguished from the Broom, or Genista, and it has a specific name in Spanish and Italian, *i. e.* Spartio and Spartea.

in the upper parts, for it is thought that one shoot is sufficient on a young vine. This month you must prune the hanging branches of the arbustive vines, that are come to perfection, and such as have no fruit. This month we are to apply the unripe figs, and the fruit of the wild[x] sort, to fig trees. This month we are to graft and to inoculate all kinds of trees to the ides of the month of July, and the fig afterwards. The same month also it is proper to cover the trees that are dug around and left unfinished. Before the ides also we may dig round the reed and willow plantations: and it is the season to plant parsley, and amaranthus, and althea[y], in gardens. The same month likewise we are to cut vetches and hay, and we are to dry them in the shade, for thus they will be sweet; and after mowing we are immediately to water, and to plough the place anew. From the day before the ninth of the calends of July you are to begin threshing, for neither showers nor dew fall on these days.

VII.

[x] This curious mode of fructifying fig trees was called by the Romans *caprificatio*.

[y] Matth. iii. 146.

VII.—PREPARATION OF ALICA.[z]

Let the spelt be decorticated and cleaned, and put into boiling water, and let it be pressed: you are then to pound and sift some white gypsum very fine, and a fourth part of very white and very fine sand is to be gradually mixed with the gypsum and sprinkled over the spelt. Let it be prepared in the dog-days, that it may not get sour. When it has been all pounded, let it be sifted through a clover sieve. The alica that was first sifted is the best; the second is that which comes after; and the third is the worst.

VIII.—PREPARATION OF TRAGUM.

What is called Alexandrian wheat must be irrigated and decorticated, and dried in a warm sun: you must afterwards do this again, until the pellicles of the wheat and what is feculent[a] fall off. In the same way also the tragum from the generous olyra[b] must be dried and kept.

IX.

[z] Χονδρος.

[a] Το ινωδες; literally, what is fibrous.

[b] Rye. In Spanish it is called *centeno*, because the Spaniards say it yields in the proportion of a hundred to one. There is a species of this grain, and it is probably what is here mentioned, which the French call *seigle blanc*, Amel corn, or French rice.

IX.—PREPARATION OF PTISANE.

Barley mixed with water is decorticated, and it is dried in the sun, and it is thus laid up. The light particles are sprinkled over it, for they make it keep. Let the proportion of water be as a tenth part of the barley. It is also wrought with salt that is not pounded, sprinkled over it. Ptisane[c] is also made in the same manner from wheat.

X.—IN THE MONTH OF JULY.

In the month of July it is proper to dig the vineyards to the second[d] hour, and in the evening, till twilight, not to any great depth; and you must take up the weeds, especially the agrostis. You ought also to level the ground that has been broken, and to make it uniform, that the sun may not affect what is under ground. You ought likewise to dig round the vines that are come to perfection, for the pulverized soil matures

[c] The French use *tisane*, which signifies barley water. The Gauls used the same word, but in their language it had a signification more analogous to the Ptisane of the Greeks and Romans.

[d] *i. e.* to eight o'clock.

tures and enlarges the grape. This month it is requisite to destroy all weeds and thorns. This month also you may fell trees, if necessity compels, when the moon is decreasing, and when it is under the earth. It is still moreover proper to plough the ground from which beans or vetches[e] have been cut; for you ought immediately to plough all the ground after the harvest, before it becomes dry. It is moreover useful to cut and to lay up leaves for fodder for the cattle. About the ides of the same month also, you are to eradicate fern and butomus, and the rush, and the common reed: and having pounded some flowering lupines with hemlock, you will pour them over the remaining parts of the roots that are left in the ground, for they will cause them to wither. If the ground indeed abounds with many roots, sow lupines in it; and having cut them when in blossom, plough them in, so that they may be buried; and having scattered a little manure over them, let them remain; and after twelve days plough them twice, and sow such things as are suitable to the ground, having mixed a small portion of lentils with the seed.

XI.

[e] The Greekexpresses chicheling vetches.

XI.—IN THE MONTH OF AUGUST.

In the month of August it is proper to gather the grapes that are ripe in warm situations, and to dig moderately round those that are not yet ripe, and round the trees in the olive plantations in the same manner; and to break the clods so as to raise the dust, for this falling on the fruit ripens it the sooner; and on this account the olives and vines near the highway bear more valuable fruit, because of the dust raised by travellers: these indeed want no digging, as well as those that are in a thin soil, the earth being dried, for they are immediately parched, having their roots near[f] the surface, on account of the tenuity of the soil. This month you ought to irrigate the grafts with water from a spunge, when the sun sets. This month you must dry your casks in the sun, and you must pitch them twenty days before they are to receive the wine. This month you are to remove the useless shoots of the late vine, for this pampination will cause the fruit to increase in size, and it makes it better, and it ripens the sooner. In young and fruitful vines indeed, you must take away some of the

fruit,

[f] On, in the Greek.

fruit, lest the more slender-bearing shoots and the fruit become useless. You must also gather the grapes for keeping, when they are come to maturity. It is the season also to take the figs that are dry in warm situations, and to prepare the trenches in which we are to plant olives, or any other trees in autumn. This month we are to water the meadow grounds that have been used to be watered; and we are to cut a second time fern, and rushes, and reeds, and the butomus. We are to break up ground that is stiff, and heavy and rich, and we are to work land that is hilly and exposed, and such as is totally shaded, and toward the north, with deep ploughs, or with spades. We are to work out our corn to the day before the ninth of the calends of September, for neither showers nor dew fall during these days.

XII.—IN THE MONTH OF SEPTEMBER.

In the month of September you must mark the fruitful and unfruitful vines, that we[*] may cut off the latter, and that we may graft the former; and let the marking be uniform with oil and pitch mixed.

[*] The transition as in the Greek.

mixed. In this month you are to insolate the chaff and the leaves of plane trees, in which we are to keep the grapes. Now it is also proper to gather nuts, and to lay them up when they are dry. To sow indeed to the day before the sixth of the calends of October is attended with uncertainty, for if a drought ensues, the seeds perish; but from the day before the fifth of the calends of October you are to sow lupines, for they do not want rain. After the ides of September, when showers have fallen before it is manured, it is proper immediately to plough and to manure thin land, and such as is full of roots and of gross weeds.

XIII.—IN THE MONTH OF OCTOBER.

In the month of October also it is proper to gather the vintage; for the fruit that is first gathered makes most wine, but that which is gathered afterwards makes better wine, and what is gathered the third time makes that which is sweeter. This month indeed, after the equinox and the first showers, some plant to the setting of the Pleiades, and they begin to set about[h] the seventh of the month of November. The same month

[h] As from, according to the Greek.

month it is of utility to dig round the vines, and to apply to the roots a lixivium, or dust, or dry ashes, or stale urine, or the lees of wine, or chaff. This month you are to graft almonds, cherries, fig trees; and you may plant in nurseries[1] the olive, the almond, the cherry, and all fruit-bearing trees; and the elm, and the white poplar, and the ash, and the pine, and the fir; but the fig tree by no means at this season. It is also useful to sow the seeds of all trees. This month also we begin to prepare the green oil, having gathered the immature olives. The same month we are to cover the citron trees, which we have in wintry situations; but we are to cover their stems with the leaves of the gourd, and we are to throw the burnt ashes of gourds over their roots. It is better to begin pruning this month, and after the vintage to dig the ground, that what has been trodden by the vintagers, being loosened, may with facility receive the autumnal showers to the roots of the trees; but there will be less weeds when all the roots are cut and destroyed by the frost. The apples also, which are kept during the winter, ought to be gathered, and laid in the sawdust of odoriferous trees, and other fruits in

 the

[1] In orchards, according to the original.

the same manner. The *asparagus palustris* is also to be now cleared of weeds. This month many begin their sowing; and if it rains after fourteen days, the seeds that are sown will be quite productive; and if it does not rain, the seeds will not be hurt. It is not however proper to sow before the calends of October: and you must observe the rising[k] and setting of Corona; for the seeds that are sown on those days will be altogether productive.

XIV.—IN THE MONTH OF NOVEMBER.

In the month of November we ought to plant vines, after the first showers, in warm and dry situations; and some persons prune them at that time in warm places; but the autumnal pruning universally improves the roots and the bearing shoots, and the vernal pruning produces a greater abundance of fruit.

XV.—IN THE MONTH OF DECEMBER.

In the month of December the vine may also be planted. In November and December you must

[k] It began to rise on the third of the nones of October.

must clarify the sweet wine, after it has left off working, and you must wipe off the impurity and scum that are in the inside of the necks of the jars with fenugreek or with clean hands. In the months of December and November it is of utility to plant and to graft the suckers of all trees that blossom early, and to cut down timber for building, when the moon is at the extremity of its course, and under the earth. You must also dig round the young vines, and those that are come to perfection, and you must manure them that are come to perfection; but it is not necessary to apply manure to the young vines. It is likewise a proper time to prune the olives after the fruit is gathered, for a greater quantity of fruit is produced from the fresh shoots. It is also a seasonable time to dig round them and other trees, and to apply a sufficient quantity of goats dung or twenty *cotylæ*[1] of amurca to the trees that are weak. It is also a fit time to plant chesnuts, and it is a good time to set beans.

[1] A *cotyla* was half a pint + 2.141 sol. inches.

BOOK IV.

HYPOTHESIS.

These things are contained in this Book, which is indeed the Fourth, concerning the select precepts of Agriculture, and comprising what relates to the planting and culture of arbustive vines, and concerning the transplanting of them, and concerning the grape called *mursinitis*[m], and that which is called *theriaca*; and concerning the different methods of grafting; and how it is that the same bunch has different sorts of grape-stones; and concerning the keeping of grapes, and many other useful things.

I.—CONCERNING THE ARBUSTIVE VINES.

THE arbustive vines are more useful than all others, for they make better and more lasting[n] and sweeter wine; and being placed at a good distance, they afford room for the ground that is between them to be sown after two years: and you ought not to set all kinds of trees for the arbustive

[m] So called, because it was grafted on the myrtle.

[n] *i. e.* such as will keep.

arbustive vines, but such as have only one principal root, as the white poplar, or such as have contracted roots, and the leaves not immoderately thick, that they may not totally shade the vine; and they are such as these, elms, black poplars, ash trees, the maple. Let them be thirty or forty feet high; and there are in some parts of Bithynia trees that are sixty feet, on which the vine is spread; and they do not injure, but they make the wine better, and especially the Aminean. In a good soil then it is indeed proper to suffer such trees to grow as it has been already prescribed; but in a thin soil you must cut them to the height of eight feet, that all the strength of the ground may not be exhausted by the trees. Let the branches also be extended as much as may be to the east and west. You ought also to dig round these trees as you do round the vine, and to manure them moderately. It is also proper that the vines should be of a good length and strong, and they must particularly be planted with good roots; and some indeed, removing well-rooted plants from nurseries, set them; but others clearing a flourishing vine, and taking it up with its roots with earth round them, lay it in a trench near the tree. Now a vine is set in this manner: plant it at the distance of three

cubits from the tree; when it has afterward taken root, that it may be united to the tree (and this is shewn from its thickness), having laid it down, and having laid some earth on it, join it to the tree, at the distance of a foot from the root of the tree, leaving the rest of the bearing-branch at liberty, and as many buds[o] as can be left, which[p] are to be removed with your nails and rendered ineffectual, that one or two shoots being left may grow with more vigour; and when this other part is grown, it is proper to apply it to the tree, that it may rest on it. You ought likewise to observe how that part of the tree may be carefully pruned, and that every thing about the root may be removed, that nothing may cover the root. It is also necessary to remember, that such vines, that is, such as are wedded to trees, are to be cut in the pruning to some distance, that the shoots are not to be left less than two cubits. It is also proper so to adjust the shoots on the branches of the tree, that the fruit-bearing parts may be exulted and moved by the wind. Let the ranks also have a distance of fifteen cubits, for thus the wine will be better and more abundant;

[o] Eyes, according to the Greek.

[p] " Removing all which with your nail render blind," in the Greek, well adapted to the original word *eyes*.

dant; and fruit-bearing trees with small roots may be set between, that is, pomegranates, apples, quince trees; and one may plant the olive at a distance, although this is not approved by some. Some also affirm that the fig tree is to be planted with vines, which experience has taught to be improper: it is therefore better to plant fig trees around at some distance. We have indeed known the arbustive vine in Bithynia to delight in the cherry tree, and especially the autumnal[q] vine; and indeed the Aminean, for it is productive of much fruit and of much wine: and one may sow this ground after two years, as it has been already mentioned; for men of experience affirm that it will not only not be injured by this sowing, but they announce[r] that the wine will on this account be better. Since indeed it happens that the vine, lying around the trunk of the tree, and thus ascending to the top, becomes in some measure, in process of time, straitened and suffocated by its union with the trunk; many persons in Bithynia place a wedge between the vine and the tree, and having thus separated the vine from the tree, they give it room, that it may be relieved.

II.

[q] Which ripened early.

[r] As in the Greek.

II.—ANOTHER,[a] CONCERNING THE ARBUSTIVE VINES.

Fix three goats horns erect around the arbustive vine, with the pointed parts downward, and the others upward, and cover them with earth, that a small portion of the horns may remain out of the ground, that the rain falling may irrigate the horns, and the vine will be very fruitful.

III.—HOW ROOTED VINES MAY BE EASILY AND SPEEDILY TRANSPLANTED.

When we begin to ablaqueate, that is, to dig round large vines once and a second time, there will be great advantage from much diligence. From a vine then that is come to perfection, that is, from the tenth year and upward, having selected a very long and a very generous shoot[t] from the inferior part, that is, to the height of a foot from the ground; having set it, cover it in a trench dug a foot deep, and of such a depth as to receive four eyes, for it is proper that so many should be covered with mould, but in such a manner

[a] Chapter is implied.

[t] Κλημα, a cutting.

manner that, after digging in the four buds, they that are at the upper extremity and above the ground may not be more than two or three eyes. If indeed the shoot is larger, so as to be sufficient for a second trench, you are to make two quicksets from one, in the same manner, and according to the symmetry prescribed; and you are to dig in the second part of the shoot; but you ought to take off the remaining shoot, after laying the two, from which two rooted vines grow, as being for the greatest part useless. You ought also to observe and carefully to beware, that it may not shoot between the old vine and the part that is dug in; for it happens that two or three buds shooting between prevent the shoot that is laid from taking root: you ought therefore, when you observe this, to take off the buds with your nails so as not to permit them to shoot; and if new ones arise, you ought also to remove them. When there are indeed two or three eyes, which we have prescribed proper to be left at the extremity of the layer, for they give it that name, it is right to leave the best bud of one eye only, and to fix a slender stick or reed to the bud that is left, that the tender shoot may rest on the reed, and that it may not grow crooked nor straggle. The roots indeed become stronger when the shoot

is

is cut the second year from the vine, that the plant remaining too long, and drawing the strength of the parent tree to itself, may not hurt it: but the inhabitants of Bithynia, at the completion of the year, having made an incision only in the shoot already mentioned, do not separate the plant from the mother stock, which has not yet taken root, nor do they suffer it to encumber the mother stock, but they observe what is proper for both in the incision, cutting it off when it is perfect, and when it is time to transplant it, that is, at the beginning of the third year. Moreover, plants that are rooted and cherished in the nurseries seem to be the most useful, and especially the cuttings that are set as truncheons and afterwards transplanted; for these may be easily raised without disturbing the parent stock, and they grow more speedily, and they become vines without much trouble.

IV.—CONCERNING THE MYRTLE-GRAPE.

The myrtle-grape hath myrtle branches underneath; and the grape becomes myrtle-flavoured, if you graft shoots of the vine on the myrtle.

V.

V.—CONCERNING THE EARLY GRAPE.

If you graft the black grape on the cherry, you will have the grape in the spring; for the vine will produce the grapes at the time the cherry produces its own fruit. The vine will also shoot speedily, if having mixed pounded nitre with water, and having reduced it to the consistence of honey, you bountifully smear the eyes immediately after pruning; for it will shoot after eight days. You will likewise make the grapes come early by scattering a sufficient quantity of grape-stones that are sweet, that is, that are not yet turned sour, over[1] the plants; but you will do better if you apply the grape-stones already mentioned to the plant, when it is planted.

VI.—CONCERNING THE LATE GRAPE.

It is proper to remove the bunches that first grow, for others will again spring up in the places; bestow likewise greater attention on the plant, and it will produce clusters a second time, and these, when ripe, will be late: take these clusters also,

[1] The Greek word implies they were to be scattered over the roots of the plants.

also, and lay them in earthen vessels that are perforated underneath, and cover the upper part carefully, and tie the vessels to the vine, so that they may not be moved by the wind.

VII.—CONCERNING THE GRAPE WITHOUT KERNELS.

SOME raise the grape without kernels in this manner: they gently divide equally so much of the shoot that is to be planted, as they are to bury in the ground, and they take the pith out with a scraper; they then tie it with wet papyrus, and set it. But it is better if the whole of the shoot that is set in the ground, be set with a squill put into it, for the squill promotes its growth and union. Others indeed cut fruit-bearing vines, and they remove the pith of a fruit-bearing shoot with a scraper as deep as they can, not dividing the shoot, as it has been prescribed, but suffering it to remain united, and dissolving *opos*[u] of Cyrenaica in water, and reducing it to the consistence of *sapa*[v], they pour it in; and placing the shoots erect, they bind them to supporters, that the opos may

[u] Laserpitium.

[v] Εψημα means sometimes *sapa*, sometimes *carænum*. Pliny says it was boiled down to a third part, l. xiv. 9.

may not be spilt; and they apply the opos every eighth day to the shoot, until it buds: you are also to do the same thing with regard to pomegranates[w] and cherries, if you wish to raise the fruit without seed.

VIII.—CONCERNING THE MEDICINAL AND CATHARTIC VINE.

It is well known that the vine called theriaca is applied in many cases, and particularly to the bite of serpents[x]. But we are now to say in what manner it is prepared: having divided the lower part of the vine which we are going to plant, to the depth of three or four fingers, and having taken out the pith, we pour the antidote into the shoot; having then bound the divided part with papyrus, we plant it: but they who do it with greater care, also pour the preparation over the the roots. We likewise prepare the cathartic vine in this manner: we divide the shoot and put hellebore into it. But it is proper to know that the shoot of the theriaca left for planting, hath

not

[w] Καρυας seems to be introduced for ροιας by mistake, in the original.

[x] Venomous beasts of the creeping kind.

not the same power; for, when transplanted or grafted, it becomes languid, the preparation transpiring in time. Moreover it is proper to apply the preparation to the roots at certain intervals. The wine being drunk is of service against the bite of serpents, and the vinegar made of it, and the grape, and the dried grapes when eaten; and when these are wanting, the leaves of the vine pounded and laid on. When all these are deficient, the ashes of the shoots of the theriaca, when burnt, being applied, will save the patient: but besides the theriaca, the shoot of any vine is of service against the bite of a dog, but not when he is mad. Florentinus mentions these things in the first and second book of his Georgics.

IX.—CONCERNING THE SWEET-SCENTE DGRAPE.

If you wish to fill a place with sweet scent, having divided the shoots that are planted, inject some unguent[y] into them, as it has been prescribed; but you will act more judiciously, if you irrigate the branches when wet with the unguent, and so graft or plant them.

X.

[y] Μυρον.

X.—THAT WASPS MAY NOT TOUCH VINES OR GRAPES, OR OTHER FRUITS.

SIP some oil, and using respiration sprinkle it over the vines, and over grapes and other fruits.

XI.—HOW GRAPES REMAIN ON THE VINE IN PERFECTION TILL THE SPRING.

HAVING dug a trench to the depth of two cubits near the vines in a very shady situation, and having thrown in a quantity of sand, fix some sticks, and bending the branches, turn them once or twice, moving them carefully with the bunches; and disengaging them from their supporter, cover them, that the clusters may not be wetted nor touch the bottom.

XII.—CONCERNING THE GRAFTING OF VINES.

THE person that grafts a vine must choose a thick stem, which is able to support one or two bearing shoots. Some indeed graft it in the earth, descending to the depth of half a foot, and they make the insertion almost at the bottom of the vine; and some graft it in the part even with

the soil, which is the best method: but that which is grafted high coalesces with difficulty, being agitated by the wind. But if it is necessary to graft high because there is no smooth place below, having prepared a supporter, tie what is grafted high to it on account of the wind. Some likewise graft[z] it toward its upper extremities. If you also graft the vine on the cherry, you will have very early grapes; for at the season in which the cherry-tree has been accustomed to produce its own fruit, it will at the same period afford grapes, that is in the spring. But the time of grafting is in the spring, when the frosts have totally ceased, when the vine being cut emits not much moisture nor water, but a thick and glutinous substance. You must select the shoots for grafting, round, solid, having many eyes, and chiefly from the bearing branches. Two or three eyes are sufficient in a shoot; but if it is set in the earth, three or four. It is not right to cut from one shoot above two grafts for insertion; for that part which is behind the seven first eyes is sterile and useless: but fresh shoots having a part of the former year's shoot will

coalesce

[z] The expression, according to the Greek, is "graft its shoulders."

coalesce more firmly. We are not to insert the shoots immediately after they are taken from the vine; but having covered the cuttings, and having laid them in a vessel, that they may not transpire[a], we are to insert them when covered before they begin to bud. Such shoots indeed then will be inserted more firmly in the earth at the bottom of the vine, the mould affording aid to their nourishment; but they will produce fruit later, as other shoots planted in the ground; and such as are inserted in a higher situation will coalesce with difficulty being agitated with the wind, but they will produce fruit at a more early period. The shoots then inserted high ought to be smooth and even, of the thickness of a man's thumb; and it is of use to cut with a sharp pruning-knife the roughness left by the saw. The inserted shoot also ought to be trimmed to the length of an inch or two on one side, as we see the reeds with which we write prepared[b]; so that the pith may appear unhurt on one side, and the bark on the other; and the shoot is to be fixed to the extremity of the part that is trimmed, so that the intermediate space between the mother stock and the shoot may not be dis-

K 2 united

[a] *i. e.* that the moisture may not evaporate.

[b] Γλυφομενυς, carved.

united[c], and it must be filled with cement or with potters clay, for that will keep out the wet, and it will preserve its native moisture: the part also of the stock is to be tied at the incision with a band, single indeed, but strong; it is then proper to cover it with unctuous clay; some also mix cow-dung with the clay. The shoots being grafted, we irrigate the band with water from[d] a spunge in the evening, in the middle of the summer; and when the germ is become four inches long, it is proper to fix supporters, and to tie it on account of the wind. When the germ indeed is grown, you are to cut the band with a pruning-knife, that it may be liberated from confinement, and that the moisture from the stock may be conveyed to the shoot. You must cut the shoots for grafting when the moon is in the wane, for thus the shoots that are grafted will be stronger. Some also graft not only in the spring, but likewise after the vintage, for the vine at that time has more inspissated moisture.

XIII.

[c] Yawn, according to the Greek.

[d] Through, according to the Greek idiom.

XIII.—CONCERNING GRAFTING BY TEREBRATION.

The mode of grafting by terebration seems to me to be the best; for the engrafted vine does not remain useless in the intermediate time, but it likewise bears fruit, and the shoot, when it coalesces, will increase at the same time, the vine being by no means hurt from the operation of boring, nor by the constriction[e]. But the mode of grafting by terebration is performed in this manner: having bored the trunk of the vine with what is called the Gallic[f] auger, and having drawn a branch of a bettermost vine, place it in the perforation, not cutting it from the old mother stock, and thus the shoot may live cherished by the mother plant, and fostered by, and coalescing with the vine that receives it; and within the space of two years the shoot that is introduced will be united with it. You must then, after the cicatrization, cut off the shoot which is

 detained

[e] *i. e.* of the bandage.

[f] The Gallic was thought to be an improvement on the Roman auger. It excavated without burning; there was less inconvenience from saw-dust, and it was esteemed better for grafting. See Pliny, lib. xvii. 25; Columella, iv. 29; and de Arboribus, cap. viii.

detained by its old mother plant, and saw off the stock of the engrafted vine above the terebration, and then the inserted shoot becomes the principal branch of the vine.

XIV.—THAT THE SAME CLUSTER MAY HAVE DIFFERENT GRAPE-STONES, THAT IS, GRAINS; SOME INDEED WHITE, AND OTHERS BLACK OR YELLOW.

You are to take different shoots of different kinds, and to divide them in the middle, but to take care that the slit does not come through the eyes; nor that any of the pith falls off; and you must apply and fasten[s] the different kinds to each other so that the eyes coincide acccording to their places respectively, and that two eyes become united: you are to bind the shoots also fast in papyrus, and to cover them with squill or with very glutinous mould, and so to plant them, and after three or five days to water them until they shoot.

XV.—CONCERNING THE KEEPING OF GRAPES.

You must cut off the grapes gathered for laying up during the winter after the full moon, when

[s] Glue, in the Greek.

when it is fine weather, about the fourth hour of the day, when the dew is dried up; and you must take care that all the grape-stones,[h] that is, the grains, are sound; and you must also have a very sharp pruning-knife for this purpose, that it may be performed with ease and not with violence. You ought also to cut the grapes that are come to perfection, and not such as are sour, nor such as have past to a degenerate state. Some indeed then cut the bunches singly, and others cut small branches with the leaves, that is, separating the shoots with the bunches; they immediately cut off with scissars the putrid and dry and sour grape-stones, if there are any, that they may not infect those that are near them; and it is proper to smear the cut of the shoot of each cluster with melted pitch. You must then indeed spread the bunches on a pavement, each in a separate place, not touching each other, straw being spread under them, of lupines indeed if there is some, for this is more firm and more dry, and it has the power of keeping mice away: and if there is no halm of lupines, the next is the halm of beans, and of vetches, and of other pulse: and in respect of

 corn,

[h] Τας ῥαγας. Ῥαξ was the stone which covered the kernel or γιγαρτον.

corn, barley straw is the most eligible; but if there is nothing of this kind, having cut some hay small, strew it under them. You must also spread the small branches with their leaves on a pavement, or you must hang them up: but some lay the bunches ins iraion, that is, in sapa, for a short time; but some lay them in small vessels that are pitched, with dried sawdust of the pine, or of the fir, or of the black poplar, or with the flower of millet: others having immersed the bunches in sea-water that is boiled, or, where the sea is not near, in brine with wine mixed with it, lay them on barley straw. Some also having boiled ashes of the fig, or of the vine, with water, and having besprinkled the bunches and dried them, lay them on the straw already mentioned. But grapes are kept a considerable time suspended in granaries, and especially if the corn is moved; for the dust arising from it resting on them, conduces not a little to their preservation. You are to preserve grapes also thus: having boiled rain water, so that a third part of it is left, having exposed it in the open air, that is, having cooled it, pour it into a vessel that is pitched; then taking the bunches of ripe grapes, having the grape-stones solid, having picked the immature and putrid from them, throw them in,

so

so that the water may cover the bunches; and having carefully set on the cover and secured it with gypsum, set them in a place that is cool and not exposed to the sun, where there is to be no fire burnt; and the water of these is found to be of a vinous quality, and of use to persons that are sick, and the bunches are preserved genuine. Some advise to hang the bunches in an upper chamber, having tied them, not from the upper end, whence the separation of the bunches is made, but from the part beneath, that they may perspire more freely, the grape stones being better exposed by the action of bending backward. It is also of use to suspend them in a cask of must, while the must neither touches them, nor they one another, for they keep as they were taken from the vine. You will also preserve the bunches, if immediately after the vintage you throw them unhurt and whole into a pitcher, and carefully stop the mouth of the pitcher and secure it with gypsum. Being also covered with potters clay, that is well wrought, so as to have the consistence of honey, and being suspended, they are preserved, and they are washed clean for use. They are preserved in the same manner, being rubbed with the juice of purslane, and hung up. Some pre-

serve

serve them in wine mixed with water. The grape keeps a whole year; if, having thrown warm water, having alum in it, over it, when gathered rather early, you instantly remove it. The grape is also preserved in honey. What has been said in relation to the grape, suits apples also.

BOOK

BOOK V.

HYPOTHESIS.

These things are contained in this Book, being the Fifth of the select Precepts on Agriculture, and comprising the method of planting and raising the vine, and when it is proper to gather the fruit, and what relates to the keeping away of animals inimical to it; and what relates to the preparation of Œnanthe, and to the making of dried grapes; and what relates to the planting of reeds.

I.—CONCERNING LAND FIT FOR VINES.

Land that is of a blackish colour, not dense, and having a moderate quantity of good[k] water at some depth, is adapted to vines; for such land receiving the showers, neither wastes them by admitting them under ground, nor does it retain the water on its surface, for that which is retained on the surface rots the plants. One ought therefore to examine the soil to some depth, for we often find indeed what is of a blackish

[k] Sweet, in the Greek.

blackish colour above, and a soil of potters clay underneath, and the reverse again. But land that is thrown up by flowing rivers, is the best; whence we commend Egypt. And to speak briefly, every soil of a blackish hue, not too dense nor too glutinous, but having moisture, is well adapted to receive the vine.

II.—THE KINDS OF VINES; IN WHAT SOIL YOU ARE TO PLANT THEM, AND WHAT POSITIONS ARE ADAPTED TO THE VINE.

You are to plant the white vines in the soil of blackish colour, and which is moist and watery, already mentioned; for these kinds want more nourishment from the soil, as they are of a firm texture, and dense, and they are raised with difficulty. A soil of potters clay likewise, unless it is altogether thin and broken into fissures, receives the white[1] vines: such vines however do not suit a dry, and thin, and sandy soil, but they which have thick grape-stones and little pith, as the black grape generally is, producing good, and much, and strong wine, being of a quality contrary to the white vines, which are naturally difficult

[1] *i. e.* vines bearing white grapes.

difficult to be raised. That called *Psithia*[m], and the *Corcyræan*, and what is denominated *Chloris*, being white, alone love a thin soil, because they are richer. For it is necessary to plant those which are indeed naturally more moist, in squalid and cold and more dry situations; but those that are dry, in moist situations; for thus what is wanting to the plants may be supplied from the nature of the soil. It is universally proper therefore to se. the kinds of vines that are not easily nourished, but such as are of a contrary nature, in a more exuberant soil; and in a soil of blackish colour, such as are thriving and able to draw to themselves all their aliment from the earth: for those of prosperous growth set in rich ground do not accelerate the ripening of the fruit, but they run into a profusion of leaves; and those that are weak will produce fruit that is worse[n] in drier situations. It is therefore necessary to form a judgment and a discrimination of the plants and of the soil, as it has been demonstrated, and thus to fix the temperament.[o] For this reason some transfer the plants from mountainous into champagne situations, and again from

[m] This is mentioned by Columella, lib. iii. 2. 24.

[n] Weaker, according to the Greek.

[o] *i. e.* mixture of different qualities.

from champagne situations into such as are mountainous, for they say that the earth loves a contrary affection. Of all the vines indeed that called *Mursites* is the best; for this is that which in Bithynia produces the wine called Dendrogalenon; in other regions again the Tiarenon[p]; and in Tios of Paphlagonia, the Tianon; and in Heraclea[q] of Pontus it produces the most celebrated wine; and wherever this vine is planted, it will produce fruit greatly superior to that of all others; for its grape is very sweet and nectareous when eaten, so that the bees also have recourse to it in quest of nourishment. It is indeed so very productive, that it bears clusters on all the stem, such as are round in their appearance; and the grape-stones are pellucid, and the kernels and the pellicles are even transparent; but it has the pedicles, which support the clusters, in general hard and ligneous. It delights also greatly in lofty[r] trees, and it likes to be assiduously pampinated. But that wine is the best which is produced from vines planted in dry and inclined situations, and facing the east or the south. It is indeed more proper to plant the

[p] From Tiare, a town of Mysia.

[q] On the shore of the Euxine Sea.

[r] In the arbustum.

the arbustive vines in a champagne, and hollow, and even situation: but you are always to remember, and particularly to observe, that the land is certainly more adapted to a plantation of low vines, which is in irregular and gently-inclined situations, and in such as are more elevated and more dry, for this will receive the summer's heat with less intenseness, being well exposed to the air: and that which is expanded in tumulose situations, and at the bottoms of mountains, suits low and prostrate vines; for in such situations the soil from the top, and whatever is nutritious and of a fertilizing quality, is gradually conveyed downward imperceptibly by the descending showers. But you must not plant vines on the tops of mountains, for the wet conveyed from them with the soil, leaves the roots naked and without nourishment. But you ought to plant the arbustive vines in champagne and even and moist ground, and especially in warm situations, where the winds not being too powerful, but blowing moderately, cherish them suspended on the trees; but the winds being vehement in cold situations, hurt the arbustive vines. The *Theriaca* is undoubtedly the best of all for the sweetness of its wine, to which Democritus bears testimony with regard to salubrity and superior goodness; but it bears a shoot naturally slender and feeble.

III.

III.—CONCERNING THE NURSERY.

That is called the nursery, in which plants are set to be transplanted, and, as the Bithynians say, where they are preparatively nursed. Let the plants be set in the nursery not less than a foot deep; for thus the plant will be easily dug up with the spade, and it will always be more benignly warmed by the sun: but let such as are called the anterior shoots, and what is of superfluous growth, be removed, that it[*] may increase in thickness. It is also proper they should be removed with the hand, not with the knife, for the application of the knife makes the young vine become torpid. Some indeed transplant it the second or third year; but the sets that are transplanted the third year will be more generous. It is not proper to water the nurseries, unless we are also to water the vineyards; for every thing that is done in the nursery, must be also done in the vineyard.

IV.—CONCERNING CLIMATE[†].

We ought always to adapt our plantation to the nature of the place. For if the situation is warm,

[*] *i. e.* the plant.

[†] According to the etymology of the Greek word, it seems to signify what is in English called *aspect*.

warm, we are to set our plants facing the north; and if it is cold, we are to set them toward the south; and if it is between these extremes and temperate, an eastern and western aspect will be more eligible: an eastern one will still be more so, if it be not infested by the south-east: and sometimes a western aspect will be rather preferable, when being at a distance from the sea it has the western breeze blowing towards it: and universally in more warm situations the northern winds are suitable, and in such as are cold the southern breezes.

V.—CONCERNING MARITIME SITUATIONS, AND SUCH AS ARE NEAR RIVERS.

MARITIME situations are much adapted to the vine, both on account of their warmth, and on account of the moisture that imperceptibly rises from the sea to nourish the plants; and the sea breezes are very useful to the vines. It is the opinion of most persons that there ought to be no river near, much less a marsh, on account of the vapour and cold air that continually rise there: blights also arise, noxious to the vine and to the corn grounds, and rendering the air hurtful. You ought moreover carefully to avoid marshes as

much as possible. But it is proper to know that whatever vines have been used to be hurt by such winds, or by clouds, or blight, when raised on trees, that is, when become arbustive, they will not be hurt.

VI.—CONCERNING THE TIME OF PLANTING VINES.

Some advise to take the shoots and immediately to plant them at the beginning of the spring, while the western breezes blow: and some advise not to plant immediately at the beginning of the spring, but they recommend to take the shoots and to plant them when the plants are going to bud. The[v] seasons then indeed for planting vines are different; for some truly plant them after the vintage, when their leaves are falling, and some at the beginning of the spring. But I having received my knowledge from experience, advise rather to make every kind of plantation, and especially of the vine, in situations that are not irrigated, in autumn; for then the shoots, eased from their burden and from the weight of the bunches of grapes after the vintage, and having recovered their strength and power, and not yet

[v] See Columella, 3. 14; Palladius, 3. 9. and 10. 4.

yet worsted by the frost, will more speedily coalesce with the soil, and nature particularly cherishes the roots more at that time. We ought therefore, as it has been observed, to plant in situations that are not watered, in autumn, that the showers that fall during the winter may supply the want of irrigation. I have done this in my Maratonyme villa (whence I am induced to date the origin of the thing), and in other places where I have possessions: and they indeed who saw and heard of what was done disapproved of it at the beginning; but having afterwards received much advantage from the practice, they were pleased, and followed my doctrine; and this holds good among us to the present time. This is however evident, that it is not proper to plant the vine after the vernal equinox.

VII.—IT IS PROPER PREVIOUSLY TO KNOW WHAT KIND OF WINE THE GROUND TO BE PLANTED, WILL YIELD.

I THINK it very necessary that the vintager should first of all know what kind of wine will be produced from the land that is to be planted; and the experiment in relation to this is made in this manner: having dug a trench to the depth

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of two feet in the ground that is to be planted, and having taken some mould from the spot that is dug, throw it into a glass vessel with some clean rain water; and having mixed and perturbed the water, suffer it to come to a perfect sediment, and it will then be quite visible to you through the transparent glass: and when it has perfectly subsided, taste the water; for as the taste of the water will be, expect that the vine will be also like it. If indeed you then find the savour disagreable, or the taste bitter, or saltish, bituminous[u], or otherwise bad, decline the planting of that ground; but if you find it well flavoured, and pleasant, and sweet, and extremely good, plant that ground with confidence.

VIII.—WHAT SHOOTS OUGHT TO BE PLANTED, AND FROM WHAT PART OF THE VINE, AND WHETHER IT IS PROPER TO PLANT SHOOTS FROM YOUNG OR OLD VINES.

When vines will produce fruit in perfection, you ought to have an eye to those that bear good fruit, and plentifully, and have many eyes and no blemish, and to mark them all, and to take

the

[u] Ασφαλτωδη, of the taste of asphaltos, which is a species of bitumen.

the plants from them in the season for planting; not from young vines, for they are feeble; nor from old ones, for they are barren; but from such as are the most vigorous, or rather before they arrive at that period. But you are to take the shoots neither from the highest nor from the inferior parts, but from the middle of the vine; and you are indeed to throw away a shoot that is rough, and extraordinarily wide, and hollow[w], and that has few eyes, and the root end contracted; and you must take the shoots that are round, and smooth, and solid, and having many eyes, and many fresh buds: and let the shoots that are taken, also have a part of the shoot of the former year; and when taken, let them be immediately planted, for what is recently cut coalesces with the soil more speedily, as being quite alive: but if the planting is necessarily delayed a short time, it is proper to dig the shoots into the earth, as soon as they are taken, either loose, or remissly tied, that they may all be cherished[x] by the soil, which is to be neither too dry nor too moist; and that is better, whence they were taken. If indeed it is necessary to keep the plants longer,

[w] Αναρθηκωδεις, like ferula.

[x] Enjoy, in the Greek.

let them be put in a vessel[y] that is dry, some mould being previously spread under it, and some being also thrown into it, that they may have the benefit of the soil on all sides: but the vessel ought to be carefully stopped with clay, that neither the wind nor the air may be able to get in, for the plants thus keep unhurt during two months. Some indeed have kept shoots received from a great distance fresh[z], having laid them in squills, or in edible bulbs. But plant such as are hurt by time and become dry, having put them in water during a night and a day; and if the ground is more than commonly dry, it is better to irrigate the shoots that are healthy, and so to plant them. It is proper also to take care that the shoots to be planted may not germinate before they are set, for they will die; but that part of a shoot is better for planting which extends to seven buds[a]. The shoot then is good and fit for planting, from one that is of the former year, as far as seven buds; but otherwise it is useless. Wherefore some do not do well, who cut the shoots longer into two or three parts, and plant them.

IX.

[y] Εν πιθω, in a cask.

[z] Green, in the Greek.

[a] Eyes, literally.

IX.—HOW VINES OUGHT TO BE PLANTED, AND WHAT OUGHT TO BE DONE, THAT THEY MAY SPEEDILY TAKE ROOT; AND WHETHER A SHOOT IS TO BE PLANTED STRAIGHT OR IN AN OBLIQUE POSITION.

THEY who plant a vine ought to remember always previously to apply moist cow-dung to the roots, and to the upper extremities of the shoots; for they say that reptiles and worms, when they smell it, do not get to them. It is also proper to scatter a small quantity of pounded mast of the oak, and vetches that are bruised and once ground, so that they may be only bruised and separated, to mix with the mast, and to scatter them over the places where the plants are to be set; for these contribute to the facility of their taking root, and to the keeping[b] of the wine, and to produce plenty of fruit. Some also throw in with the plants the halm of pulse, and especially of beans, for such things keep them warm during the winter, and they prevent injury from noxious animals; and some pour in urine. It is also proper to throw in a handful of parched

 grape-stones

[b] Πρὸς παλαιωσιν, to the age, *i. e.* to give it strength to enable it to keep.

grape-stones[c] into each trench, the grape-stones of white grapes indeed to the black kinds, and of black grapes to those that are white. You may likewise plant your shoot straight; but that which is oblique is better, for the latter takes root sooner. Whether the plant is set straight or crooked, you must put three or four sizeable[d] stones around; you must then throw in the mould with the dung, treading it level: it is likewise necessary to take care that the eyes near the soil may not be inefficacious; you must then lay on more stones of the same size, and tread them in. Manure indeed thrown in cherishes and strengthens the plant, and grape-stones make it take root sooner. The stones also prevent the mould from falling in altogether, and they keep the roots cool in the summer. Sotion also recommends to apply[e] the least quantity of the pitch of cedar to the extremities of the roots of the plant; for it does not suffer it to rot, and by its smell it prevents reptiles from getting in. Some indeed then do not turn the ground, but simply use a setting stick, and set the plants: but this

[c] The Greek strictly means the kernels contained in the stones.

[d] One of which was a handful, according to the Greek.

[e] The Greek implies that this application was in a moist state.

this is very disagreeable to me, for the mode of planting, with a thorough digging, is better than the planting by means of the setting stick; for in the latter case indeed the eyes are injured[f], and the shoot is distorted, but in the former it is set straight and unhurt.

X.—WHAT DAY OF THE MOON, AND WHETHER WHEN IT IS ABOVE OR BELOW THE EARTH, IT IS PROPER TO PLANT VINES.

Many of the ancients positively affirm that you are to plant vines from the first till the fourth day of the moon's age; and some advise to plant them on all the days while it increases, and to prune them when it decreases. Others decline planting when it increases; but this is acknowledged, that it is of utility to set vines when the moon is under the horizon; and to cut wood likewise when it is under the horizon. But Sotion says, that it is right to plant vines on the days when the moon is invisible, that is, on the first and second day; and other trees before the moon becomes apparent to the human race, for he says, that such things as are planted on these days all take root; but I have often planted when the moon

[f] Blinded, in the Greek.

moon was decreasing, and I have not repented. Sotion reckons the twenty-ninth and thirtieth among the days of the moon's invisibility. It is proper to take the shoots for planting and for grafting when the moon is decreasing.

XI.—WHAT MAY BE RAISED IN VINEYARDS.

SOME plant beans and vetches[g] in their vineyards, as having the power to preserve the plants unhurt; and some indeed sow gourds and cucumbers: but experience has taught me that it is useful to sow nothing in the vineyards; for the things that are sown take away the nourishment from the vines, and the shade is hurtful to them. Avoid most particularly the cabbage as naturally dry, and having a native antipathy to the vine. It is well known that if any one pour the least quantity of wine over cabbage while it is boiling, it will not boil to perfection, and its colour will be spoiled. Persons also wishing to drink much wine and not to be inebriated, previously eat raw cabbage. If it also happens that the vine and cabbage are planted the one near the other, the vine while growing, when the cabbage approaches, does not make a straight progression, but it be-

comes

[g] A vetch of this species was called οροβος.

comes distorted, having an antipathy to the cabbage. Tarentinus also says that you are to sow nothing at all between the vines, which I likewise recommend, having experience for my teacher.

XII.—CONCERNING THE DEPTH OF PLANTING VINES.

It seems to me not to be right to make the trenches for vines less than four feet in depth; for those that are planted on the surface soon grow old, and they produce poor fruit, receiving little nourishment in a scanty soil, and they are scorched in the summer. But it is necessary to dig and to plant as deep as the heat of the sun penetrates; and they affirm that the heat of the sun does not descend further than the depth already mentioned, unless the ground has fissures; but if you plant to a less depth than what has been prescribed, you will have vines that will be useless, and they will soon grow old. Be persuaded then that a depth of four feet is nutritious, but that which is lower is steril; but a plantation made to the depth of three feet is not bad.

XIII.—WHETHER IT IS NECESSARY TO PLANT TWO SHOOTS, OR ONLY ONE, IN A TRENCH.

It seems to me to be necessary to set two shoots together instead of one in vineyards; for if one fail, the other will live: but perhaps it may not be proper to set two shoots in nurseries where there are so many shoots already set. It is however certainly right to set two, that we may leave that which is most thriving. When two shoots indeed are planted in vineyards and become strong, that which is the weakest is undoubtedly to be taken up; and that which is left is to be tied to stakes, which is to be suffered to remain in its place, or to be transplanted; for if two shoots are permitted to be in one trench, their roots are confined, and they do not partake of sufficient nourishment, as two infants are not fostered by one nurse.

XIV.——CONCERNING THE DIFFERENCE OF QUICKSETS[h], AND OF THOSE RAISED FROM CUTTINGS.

The rooted plants of vines seem to differ from cuttings in this, that the rooted plants have an acknowledged

[h] Και των απο κληματος; literally, "and of those raised from a cutting." Κλημα was a cutting, which was set in the ground

acknowledged growth, having once taken root; and the latter are in expectation of taking root. The rooted plants also indeed produce fruit the second year or even sooner, and those from cuttings hardly the third or fourth year: but[1] transplanting makes the fruit better. Some do not act properly that cut the longer shoots into two or three parts, and plant them; for that part from one to seven eyes is only useful, but the part above is of no use, according to the opinion of Florentinus and of the Quintilii.

XV.—THAT IT IS NOT PROPER TO PLANT MIXT KINDS OF VINES, AND ESPECIALLY THE WHITE WITH THE BLACK GRAPES.

EVERY vine is not of the same nature nor of the same season; but one indeed brings fruit to perfection soon, and another late. The fruit is also different; for some is yellow, some is black, [illegible] and [illegible]

to grow. The Latin word *sarmentum* is not well applied to convey the meaning of the Greek term with perspicuity, although it is so constantly used in the translation. The Greeks called the shoot, which they used as a graft, επιπηγα, which the Romans called *surculus*.

[1] This and the preceding sentence are inverted in this translation, for they seem to be misplaced in the original.

and some is white: some is indeed sweet, and some is bitter, and some is indeed light, and some is heavy, and some is durable, and some is not so: and some wine indeed is better when it is old, and some when immediately drunk; and the nature and management of each is different. You ought then to avoid the mixing of these, lest the best being mixed may be hurt by the worst. But nothing hurts wine so much as when the early grapes are gathered with those that are later; but that is to be accurately observed above all things, that the white may not be trodden with the black grapes; and it will be much better if they are not planted together, for they have a certain natural antipathy to each other.

XVI.—THAT IT IS BETTER NOT TO PLANT VINES OF THE SAME SORT, BUT THE DIFFERENT KINDS APART.

THEY do most prudently who plant three or four kinds of vines apart in the vineyard; for they will all prove productive together, or they will not all prove defective together, for it is precarious to depend on one kind: for this reason then it is not proper to plant promiscuously, but separately, according to the different kinds; for there

there is a very great difference in vines, not only in respect of colour, but in respect of quality likewise; and the wine that is made from the different vines has a consummate difference.

XVII.—CONCERNING THE DIFFERENCE OF KIND IN VINES.

Every vine indeed does not produce the same wine in every situation; for the quality of the air also contributes greatly to its goodness, and on the contrary it is hurtful to it. The Aminean, however, in general produces wine of a more excellent kind in every situation, and particularly in oblique and dry situations, and in such as are wet, and especially if it is raised on trees. The vine also which is next the Aminean, which has small clusters of grapes and many grape-stones, which is called by the Bithynians *Drosallis*[k], which some also gather with the Aminean, produces likewise sweet wine. The white vine also, which has larger clusters, raised on trees in dry situations, produces very good wine, and plenty of it, and it is called in Bithynia *Leucothracia*; and it has oblong clusters, and the grape-stones of equal thickness, globular, and of a beautiful appearance;

[k] In some copies it is δρυσαλις.

ance; and in the season when they are ripe, of a deep red colour; and it has its shoots also red. There is also a vine in Bithynia called *Boline*, which comes to maturity soon; and it is quite early, bearing large clusters, almost a cubit long, and grape-stones that are full and of a white colour, transparent, and round, having the appendant clusters immoderately long; and what is peculiar to this alone, it throws out three shoots from every eye, while the other kinds hardly produce two from an eye; it is therefore expedient to cut[1] it quite close in the pruning of it, lest it soon become languid, as it is a great bearer. This vine is also enormously large, and it does not soon grow old, nor is it hurt by the circumambient air, and it bears the various kinds of air; it also makes wine that is sufficiently good, perhaps on account of being raised on trees; but it is not durable, from the nature of it. The Aminean also already mentioned is not less fruitful than these: it is therefore eminently proper to prefer this to all; for Varro affirms that every plethron

[1] *Σφοδρα σιμοτομειν.* Σιμος is what the French call *camard*. The Romans, by adding a letter, formed a word by which they signified a monkey, from the flatness of the most leading feature in the animal's visage. Σιμοτομειν signifies to cut flat and even.

plethron[m] of Aminean vines used to produce three hundred amphoræ. But one may leave many shoots of this vine to make a more abundant quantity of wine; for it likes to be cut to a great length in pruning, and to be allowed many shoots. You ought therefore to plant the Aminean vine principally in every situation; and if the planting of other vines has pre-occupied the ground, you may graft it; for the grafting of it is not less useful than the planting, and especially if the vine that is grafted is laid down the second year. We however prove it to be fruitful, not from the first and second year, but from many years; for the men that prune, having often left many shoots, are the cause of an ample produce of wine for one or two years. But that vine is fruitful which, having a moderate number of shoots left, always bears in the same manner. That then is to be universally reckoned fruitful, not one which bears one cluster on each shoot, but many shoots from each eye, and clusters from each of them.

[m] Plethron, in this place, evidently signifies what the Romans called *jugerum*. See Varro, i. 2, 7.

XVIII.—HOW ONE OUGHT TO PLANT A LAYER.

We are to plant the shoot called a layer[n] in this manner: having dug a trench a foot deep, and having drawn the shoot from the vine, not cutting but bending it, we set it in the trench, and we lay some mould on it, leaving a conspicuous part of the shoot to remain above the ground, that the one part, being still joined to the vine, may draw nourishment as from a nurse[o], while the other is fostered in the soil, and it takes root being doubly cherished[p]. The shoots indeed thus planted produce fruit without difficulty; and they will be well nourished which are raised from maternal and from their own roots, which are properly transplanted, when they are three years old.

XIX.—CONCERNING THE MODE OF CULTURE.

The ground to be planted is to be cleared from all wood, not only by digging, but also by often ploughing; not only by taking up the roots, but also

[n] Την καλȣμενην απωρυγα.

[o] Ωσπερ απω μαςȣ; as from an udder.

[p] Being nursed by two mothers, in the Greek.

also by carrying away the stones, and especially such as are large; for all the stones that are above burn the stems during the summer, being warmed by the sun, on account of the heat remaining in the solid substance; and the stones being again cold during the winter, and especially the small ones which are about the roots, hurt them; as, on the contrary, they that are deep are an advantage, for they refresh the roots in the hot season. The ground indeed ought to be dug so that the part which is above may get to some depth, and that the soil below may be raised to the surface; for thus that which is dry has the benefit of the moisture above, and that which is wet and dense will have the advantage of warmth and of solution. But we ought to take care that we may level the cavities as much as possible, and that we may not suffer hollow places to be in the vineyards. When one digs round the vines after they have taken root the first year, he must remove the roots near the surface with a very sharp knife the following year; for a vine that has been accustomed to spread its roots on all sides, precludes a deep radication.

XX.—CONCERNING ABLAQUEATION.

We are indeed to ablaqueate, that is, we are to dig round vines when they are two years old to the depth of two feet, to the breadth of three; and among the arbustive vines we are to cut off the creeping roots of the trees; for, as the plants of the vines being yet tender, if they meet with larger and more powerful roots, they are oppressed and disturbed: therefore there ought to be a good distance between the plants of the vines and the trees.

XXI.—CONCERNING THE CARE OF VINES.

It is proper to cut off what is redundant in vines just planted, not in a transverse section, nor near the eye, but more than two fingers breadth distant, not to the north but to the south, the incision being made behind the eye, that the sap that flows down from it may not hurt the eye underneath: and if the moisture be troublesome, smear the cut with fresh amurca that has been boiled; and you are to ablaqueate the plants twice or three times, and some throw manure over them. You are to dig round them the second year every

six

six months: and when they begin to be three years old you must carefully remove what is superfluous with a saw, and after the autumn you must dung them a foot deep. But we are to ablaqueate vines in wet situations, and we are to leave the roots near the surface, that, since on account of the abundant moisture the inundated roots cannot remain deep, they may at least spread sideways and be able to live, not having the benefit of soil to much depth, but saving it above from extension in breadth.

XXII.—HOW MANY SHOOTS IT IS PROPER TO LEAVE TO A VINE FOUR YEARS OLD, AND TO WHAT SORT OF STAKES YOU ARE TO TIE THEM.

It is sufficient to nourish two shoots on young vines the fourth year, to which more than four eyes are unnecessary, and we may indeed remove those two near the stem with the pruning-knife, and to prevent them from budding; but we must leave the two uppermost for the increase of the plant. But at the beginning of the spring the pruner must fix a strong and straight stake from five to seven feet; and let it not be more slender than a very generous reed, that it may not encumber nor shade the plant. A stake indeed

 that

that has no bark on it is more eligible, for cantharides and such things as have been used to infest the vine get into a stake that has the bark on, and they are concealed in it. You must also tie the plant, having stretched it to the stake. When a vine is likewise become to a state of perfection at the age of six years, you are to apply the pruning-knife to the higher branches[q], to three or four, according to the strength of the plant; and you are to apply a shoulder[r] stake to each leading shoot, which will be strong enough to support the shoots and the clusters.

XXIII.—CONCERNING PRUNING.

It is proper to begin pruning from the month of February or March, from the fifteenth of February to the twentieth of March. But some prune immediately after the vintage, saying that the vine is relieved when deprived of useless shoots, and that it does not, as in the spring, bleed to destroy its aliment. Those also that are pruned in the autumn shoot earlier in the spring; but if the spring be cold, and the frost attack

[q] Εις ωμους; literally, "to the shoulders."

[r] Ωμοχαρακα.

attack them, they will be frost-bitten[s]. It is therefore better in cold situations rather to cut them preparatively, and not thoroughly to prune them, that is, to leave the conspicuous eyes and shoots. It is however necessary to prune in the spring: and one ought to begin the pruning, not in the morning, but when the frost is melted by the sun, and when the shoot has been warmed. One ought also to have very sharp and very[t] good knives for pruning.

XXIV.—FOR FRUCTIFYING THE VINE AND THE MAKING OF GOOD WINE.

THE vine will be fruitful, if the person who prunes it is crowned with ivy; and if a small quantity of mast of the oak is pounded, and having some vetches ground once, so as to bruise them only, and to divide them, if you throw them into the places of the plants, it contributes to the strength of the wine and to fructification. Shoots also having many eyes make the vine fruitful, and the transplanting of the vines is conducive

[s] Καυθησονται; literally, "they will be burnt." In burning and frost-biting, the circulation seems to be affected much in the same manner.

[t] "Very cutting," in the Greek.

ducive to fruitfulness, and to the making of good wine. You will make a vine fruitful, if you plant Glucuriza[a] with it.

XXV.—WHEN ONE OUGHT TO DIG THE FULL-GROWN VINES, AND THE UTILITY OF DIGGING.

It is proper to dig before the shooting of the bud; for, when the clusters are first forming, and when the shoot is growing, the person who digs after the germinating of it, greatly annoys and displaces the fruit by the motion: it is therefore better to dig earlier. But much digging and much working of the ground are the foundation of life and of nourishment and of fruitfulness to the vine. If this is not sufficiently done before the shooting of it, it is better to withhold the digging, and when the germ is become strong, then to work on the trees that were omitted. It is proper to take care the diggers do not wound or injure the stem with the spade, and hurt it; for the vine that is wounded sickens and becomes unfruitful.

XXVI.

[a] Liquorice.

XXVI.—HOW ONE OUGHT TO DUNG THE VINE IN THE SEASON OF ABLAQUEATING IT.

The inhabitants of Libya and of the East having ablaqueated their vines, do not immediately cover their roots with mould, but suffer the trenches to be open during a whole winter. But the inhabitants of rainy countries cover them earlier, confining the roots, through which their strength exhales, in the ground. Some also make a trench deeper, and some make it of the depth of a foot; and besides the ablaqueation, they manure their grown vines with the dung of oxen, or of sheep, or of swine, or of other cattle. Pigeons dung also, being very warm, is well adapted to make vines shoot early, but it is ill calculated for making good wine. One ought likewise to apply four cotylæ of manure of each kind, of those already mentioned, to each vine. One must not, however, throw the manure over the trunk of the vine, but at a small distance, that the roots that are remote may partake of the heat, and that the manure indiscriminately heaped upon the naked roots may not scorch them: but if there be not a supply of manure, in that case the halm of beans and of other pulse

will

will serve instead of manure; for these are of utility to the vines against frost, and they are inimical to noxious reptiles. Grape-stones also make manure, but stale urine is much better. They also moderately ablaqueate and manure vines a year old, and those that are two years old likewise, to five years, according to due proportion: in tempestuous situations, however, it is better to do this to young vines every other year: but if the frost is fixed in those places, it is likewise proper to heap the mould around the trunk: but a person indeed would manure to greater advantage if, in sandy land, he made use of sheep or goats dung, for it is well known that this is good; and, in the white potters clay, of cow dung; for, as it is by nature without strength, the sweetness and the richness of the manure sufficiently cherish it.

XXVII.—CONCERNING STAKING.

Some cut the poles indeed in December and in the month of January, and some in July and August; and some indeed tie the vines lower, and some higher. But it certainly is proper to tie the Aminean vines a foot higher than the other vines, yet not more than six feet: and in light

and

and dry and sandy land, and in such as is infested by powerful winds, you must make the plant lower, but not less than four feet. You must also sharpen the poles at each end, and you must smear the upper parts alone with boiling pitch, but not those that are fixed into the ground. Let the poles also stand upright, and let them not be bent, lest they make the vines like themselves.

XXVIII.—CONCERNING PAMPINATION.

It is proper to remove the superfluous buds while they are yet tender, for you will afford the vine much relief.[v] It is also proper to pampinate with the hand with cheerfulness. To prune and to pampinate require the same experience. Wherefore persons of experience sometimes remove a shoot having fruit, and leave one that has none. But it is necessary to take away more buds from a young vine that it may not be overloaded: and when the heat of the sun begins to abate, it is necessary to remove the leaves, that all the bunches warmed by the sun may ripen. The vine also, while in blossom[w], ought to be dug.

[v] Διαπνευσιν means literally perspiration.

[w] It is possible the original expression might be μη οφειλει, ought not.

XXIX. — CONCERNING A SECOND PAMPINATION.

It is proper to remove what is superfluous about the bud gently and without violence, on vines that are recently planted, as soon as they have budded, after they have shed their blossom. But one ought to clear the leaves at the sides, thirty days before the vintage on vines that have rotten fruit, and that hardly ever bring it to maturity, on account of the moisture of the soil and of the multiplicity of the leaves, that the winds blowing on them may refresh the grape, and you are to leave the leaves towards the top, that, protecting it against the excessive power of the heat, they may throw a shade against the sun towards the top. If moreover there is much rain in the autumn, so as greatly to augment the swelling of grape-stones, you are to remove the leaves near the top, that the wine may not become sour. Some indeed in warm and dry situations likewise cover the fruit with dry[1] twigs and thorns, if there is not a supply of leaves. Let the

[1] Φρυγανοις. Φρυγανη and *κλημα* are indiscriminately translated *sarmentum*. The first signifies a dry shoot, the second generally a cutting for propagation.

the vintner[y] also diligently go round the vineyard straightening the poles and adjusting the yoke; and the yoke is called the coupling of the vine with the pole, knowing that as we, when inclined to one part of the body, are in pain, so likewise the vines when standing inclined and not straight are hurt.

XXX.—THAT THE VINE MAY NOT PRODUCE VERMIN OR CATERPILLARS, AND THAT IT MAY NOT BE INJURED BY THE FROST.

RUB the bark with bear's fat, and the vine will not produce vermin, or rub[z] the pruning-knives with which you cut the vines with bear's fat, nobody being privy to it, and neither vermin nor frost will injure the vine; or rub the pruning-knives with garlic pounded with oil. If you also boil the caterpillars that are found on roses, in oil, and rub the knives, the vine will not be injured by any other noxious animal, nor by hoar frost. Or rub the knives with goat's suet, or with the blood of a frog; or you are to rub the whetstone with ashes and oil, and you are then to set the knives. Having burnt shoots of the vine, and

[y] *i. e.* the keeper of the vineyard, from *vinitor.*

[z] See Palladius, lib. i. 35.

and having mixed them with[a] the sap of the vine, set them with wine in the middle of the vineyard, and there will be no worms.

XXXI.—THAT VINES MAY NOT BE INJURED BY FROST OR BLIGHT.

DEPOSIT some dry compost in the vineyard at various distances, according to the wind; and when you apprehend the frost[b] to be approaching, burn the compost, for the smoke being introduced will dispel the frost. It is also proper to prune the vines that are easily hurt by the frost later, when they may be prompted to bud, for they will then blossom later. Thus then the vine hippuris has been thought to be less obnoxious to frost, because I believe it shoots late, when the sun is warm. Some indeed plant beans in their vineyards, and they believe that their vines will not be hurt by the frost.

XXXII.—ANOTHER CONCERNING HOAR FROST.

IF it happens that the vines are hurt by hoar frost, and it is evident that the fruit has perished, it

[a] Δακρυω, with the gummy substance that issued out of the shoots that were pruned.

[b] Την παχνην. Παχνη signifies hoar frost.

it is proper to cut and to shorten them, that their strength may remain; and they will on that account produce fruit earlier the year following. But some, having learnt it by experience in Bithynia, affirm, when the frost is apprehended, it is proper to ventilate the ashes of the tamarisk in the vineyard; but if there is none, the ashes of any other wood, for thus the ashes resting on the eyes will keep off the assailing frost.

XXXIII.—CONCERNING BLIGHT[c].

As soon as you see the blight rising in the air, you ought immediately to burn the left horn of an ox with some cow-dung, and to make a great smoke round the ground according to the wind, that the wind may blow all the smoke to the place affected by the blight, for the smoke will dispel all the vitiated air. Apuleius also says, that the smoke of three crabs burnt with cow-dung, or with straw and goats dung, are sufficiently serviceable. But if it happens that you [illegible]

are

[c] In Greek, ερυσιβη. It was sometimes called μιλτος, because the corn, when affected by it, had the colour of sinople or red earth. The Romans called it *Rubigo* for the same reason, and sometimes *Ærugo*, because it made the grain appear of a copper colour.

are overtaken by the blight, you are to cure the injury thus: having pounded the roots or the leaves of wild cucumbers, or of the colokinthis, and having macerated them in water, besprinkle the things that are affected by the blight before sun-rising. The ashes also of the fig tree or of the oak, macerated and besprinkled, have the same effect. Apuleius also says, if you throw branches of the bay tree over the ground, that what is noxious in the blight passes into them. But it is proper to know that all things are principally affected by the blight when the moon is full, and particularly wheat, because the moon being then very warm, and having a degree of humidity, putrefies the grain in the night. Some indeed having cut the fish *silurus*[d] in pieces, burn it, according to the wind, making a smell over every part of the ground. There is likewise a certain antipathy, if the skin of a seal is perforated and stretched round a sieve, and the seed is caused to pass through the sieve, and the ground is sown. This same thing likewise precludes hail from falling, affording relief by some natural antipathy.

XXXIV.

[d] Pliny prescribes this, 18, 29, 70. Matthiolus describes this fish, p. 272.

XXXIV.—CURE FOR VINES, THE FRUIT OF WHICH BECOMES DRY.

When the grape-stones, grown to the size of a vetch, begin to become dry, then, having cut the dried part of the cluster and some of the sound part, or rather some of the sounder part near those that are become dry, you are to remove them; then rub the incision with ashes mixed with very sharp vinegar: but those ashes are better which are from the shoots; for thus the parts of the cluster going to be affected, being rubbed, will stop the injury: rub the stem of the vine also all around in the same manner. Some also besprinkle the lower parts of the stem near the roots with old and very pungent urine; for by this application not only the fruit will be saved, but the vine also will be long-lived and flourishing.

XXXV.—CONCERNING STERIL VINES.

Make an opening in the trunk with a knife or with an auger, or rather with an oaken wedge; and lay a stone in the opening, that the parts of the trunk may be separated the one from the

other, and pour in about four cotylæ of stale urine, pouring it gently over all the trunk, so that it may drop down to the roots; then lay on some dung mixed with earth. It is necessary however that they who fix a stone in the trunk should dig round the roots; but you are to apply the remedy seasonably in autumn.

XXXVI.—CONCERNING SIDERATED VINES.

You will know the vines that are planet-struck indeed from this: they have their leaves of a most extraordinarily red colour: but you will cure them if you perforate the lowest part of the trunk with an auger; and if you fix an oaken peg in the hole, or if you lay the roots a little open and apply the peg in the same way, and lay on the mould, you will then cure the vines. Some indeed irrigate such vines with sea-water; but others, having boiled oil with asphaltos, rub them, and such as have been hurt by any iron instrument, all around. Others, as in Bithynia, have from experience got the method to cure blasted vines by driving a nail through the lowest parts of the trunks: others indeed pour urine over the trunk and over the roots.

XXXVII.—CONCERNING DISEASED VINES.

Besprinkling the trunk of a diseased vine with the ashes of the shoots or of the oak, mixed with vinegar, you will cure it. Urine[e] also poured over the roots is of great use. Some likewise cut morbid vines near the earth; they then cover them lightly with the adjacent mould, having mixed a little dung with it; and when the buds shoot, they indeed remove those that are weak, and they leave those that are generous; and the following year having selected the most suitable one of those that were left, they remove the rest.

XXXVIII.—CONCERNING LACHRYMAL VINES.

Vines that shed many tears throw them out crude, and not distributed over the whole body of the vine. We are then to make an impression with a pruning-knife on the trunk, and we are to make an incision[f]; and if what is done is of no use, we are likewise to make an impression

[e] The Greek says, human urine, in this and in other passages where it has been mentioned.

[f] A wound, in the Greek.

on many of the roots; and we are to make an incision in them by some means; and we are to rub the cuts with amurca boiled to half its original quantity, and cooled: and we are to rub the eye that lies near[g] the incision externally, which has been proved to be much better.

XXXIX. — CONCERNING VINES CALLED RUADES.

You will know the vines called *Ruades* from their leaves, which are whitish and dry, and having their shoots broad and like thongs, and tender. You are then to cure them with ashes mixed with very sharp vinegar, rubbing the inferior parts, and besprinkling the parts about the stem particularly; and you are to pour the ashes, when they are wet, over the vines: but some pour sea-water over their roots; and some are careful to remove the upper parts of the bunches, and to prevent this. They have indeed been called *Ruades*, which do not retain their fruit, from[h] the circumstance of its falling off.

XL.

[g] Under, in the original.

[h] Ρυαδες απο τυ ρειν.

XL.—CONCERNING VINES LUXURIANT IN WOOD.

It is necessary to prune[i] the vines luxuriant in wood; for when they are disburdened of their shoots, they are eased; but if they continue,[k] having ablaqueated them, we are to apply river sand, and a moderate quantity of ashes to them. But some lay stones round the roots, that they may cool the vine.

XLI.—CONCERNING THE VINES THAT PRODUCE ROTTEN FRUIT.

There are some vines which, having produced fruit, putrify the clusters before they are cherished and become ripe. You are then to cure such as these with the leaves of purslane. But some having mixed barley-meal[l] with the purslane, rub the trunk around; others rub half of

[i] Μακροτομειν, to prune them so as to permit them to grow to a proper length.

[k] Υλομανειν, *i. e.* to run into exuberance, seems to be understood in this place.

[l] Αλφιτον meant the meal of barley that had not been parched.

the cluster with purslane; some also throw four cotylæ of stale ashes or sand over the roots.

XLII.—CONCERNING VINES HURT BY THE SPADE.

In relation to a vine hurt by the spade, or by any other instrument, if the wound is under ground, let it be covered with very fine earth, having mixed goats or sheeps dung with it, and bind it; then stir[m] the earth round the stem, and take care of the vine: but if the wound is about the root, having mixed some fine manure with some light earth, lay it on, and dig round it frequently, turning the shoot around, not bending it towards you, and use no violence.

XLIII.—HOW IT IS POSSIBLE TO KNOW BEFORE THE VINTAGE THAT IT WILL BE A PLENTIFUL AND GOOD, OR A BAD WINE SEASON.

Take a grape-stone, that is a grain, with your fingers, gently from the bunch, and if any moisture bursts out of it, it is an evident sign of plenty. Some also, if there is a plentiful crop of

[m] Περισκαλλειν sometimes means to dig around with the *sarculus*.

of wheat, affirm that there will be plenty of wine fruit likewise. We conjecture too that the wine will be good and powerful, if there are many showers during the spring; the showers indicate the same thing when the grape is of the size of a vetch, and is at the same time of a sour taste. But rain that falls during the season of the vintage, will make the wine not only watery, but liable to turn also.

XLIV.—PREPARATION FOR A HEDGE.

If you wish to have a secure hedge, having dug a trench a cubit[n] deep, fix stakes in it, and stretch a rope along the trench: but let there be some vetches ground in readiness the day before; and the seed of the bramble, and of the paliurus[o], and of the oxyacantha[p], being all macerated to the consistence of honey, lay the seed of the bramble, and of the paliurus, and of the oxyacantha, on the extended rope; and having besprinkled the place with[q] the stuff, permit it to

[n] = 1 foot 6.13125 inches.

[o] A species of thorn, Matth. l. i. c. 104.

[p] The Latin name is *acuta spina*, Matth l. i. c. 105.

[q] Τω αποβρεγματι. Αποβρεγμα means the act of pouring out any liquid substance.

remain a short time; then lay on the earth that was thrown up out of the trench; and after eight-and-twenty days it will produce shoots of the length of four [*]palms, which you are to transplant into a trench that is not deeper than four palms and they will grow more than a cubit in two months; then, being drawn to a great length, they will keep off thieves. Do this at the vernal equinox. You will also make a hedge expeditiously, if, having rubbed a rope with the seed of the bramble, and having dug it into the ground, and cutting some thick reeds, you plant them to a moderate depth, laying them in an oblique position, not straight, throwing some manure in with the earth. But some make a hedge in this manner:—making cuttings from shoots of the bramble, and laying them in the hedges, they bury them a palm deep, and they water them till they shoot. Some also rub a rope with the berries, that is, the seed of the bramble, when they are ripened, with their hands; then having laid on some earth with dung, they water them till they shoot. But Democritus says that a hedge is properly planted in this manner fifteen days from the beginning of the spring. But a rope that has been much used at sea, and

is

[*] A palm was equal to four fingers breadth.

is become rotten, with the seed of the bramble, and with the other fore-mentioned seeds of prickly plants, and with vetches[s], and cover them in the trench, and water them, if it can be done, every day; for thus the hedge will grow speedily and perfectly, and it will be a secure fence.

XLV.—HOW IT IS PROPER TO GATHER THE VINES, AND WHAT ARE THE SIGNS OF MATURITY IN THE GRAPES.

It is not easy thoroughly to know when it is proper to gather the grapes; wherefore some, gathering them before they are ripe, render the wine small and weak, and such as will not keep: others, gathering them later, not only hurt the vine labouring under its burden longer than it is necessary, but if hail or frost happen, they will have their wine injured. There is then a proof of the season of the vintage, not only from the taste, but from the sight also; and we will hand down some of the indications. For the followers of Democritus and of Africanus say, that the grape continues in a state of perfect maturity six days, and not more: if then the kernel is not of a transparent green colour, but black, it

[s] Called ὀροβοι.

it indicates that it is ripe; but others press the grape-stones, and if the kernel gets out naked, not having any of[t] the fruit about it, they prove that the grapes are ripe for the vintage: but if the grape-stone gets out with part of the fruit, they say they are not ripe. Some also conjecture that the grape is ripe from the beginning of making [u]dried grapes. Others indeed prove that the grapes are ripe thus: where a bunch is very thick set, they take one grape-stone thence; after a day or two they examine the bunch; if therefore the place remains the same in respect of appearance, when the adjacent grape-stones do not increase in size, they accelerate the vintage; but if they see the place of the grape-stone lessened, as when the fruit increases all around, they procrastinate the vintage as long as the increment goes on.

[t] Των σαρκων; literally, of the flesh.

[u] The *uvæ passæ* of the Romans.

XLVI.

XLVI.—IN WHAT HOUSE OF THE MOON IT IS NECESSARY TO GATHER THE VINTAGE, AND IT IS PROPER TO DO THE WORK OF THE VINTAGE, WHEN IT IS IN THE WANE, AND WHEN IT IS UNDER THE EARTH.

It is proper to gather the vintage when the moon is in Cancer or Leo, or in Libra, or Scorpio, or in Capricorn, or Aquarius; it is also necessary to hasten to do the work of the vintage when it is in the wane, and under the earth.

XLVII.—HOW IT IS PROPER TO REMEDY THE GRAPES THAT ARE BECOME SOUR, OR OTHERWISE INFECTED, AND TO CURE THE WINE THAT IS TO [v] BE MADE FROM THEM.

It is necessary to separate all the sour grapes, or such as are otherwise tainted, from the rest of the fruit, and to cure the Must made from them thus:—You are to boil rain water to half its original quantity; from this water that is boiled, pour into the wine as much as a tenth part of the Must, and boil it again with the Must, so that a tenth part of it may be consumed in the boiling. Some indeed do not manage it in this manner; but

[v] Εσομενον οινον.

but they throw water on the grapes, apportioning the third part to the future Must; and when the grapes are afterward trodden, they boil the Must so that a third part of it may be consumed.

XLVIII.—CURE OF NOXIOUS ANIMALS THAT INFEST THE VINES.

WORMS that infest the vines, or that breed in a part of the vineyard, will be destroyed by burning cow-dung according to the wind: and some having made a suffumigation of galbanum, or of hartshorn, or of goats hoofs, or of ivory dust, or of the root of a lily, in the vineyard, have driven noxious animals thence. You will also keep off noxious animals, having made a suffumigation of women's hair, and you will cure women subject to abortion by it; for they cure such affections by a suffumigation of women's hair. Others having made a suffumigation of the herb [w]pæonia, and others of that which is called [x]prosopitis, or having planted them in the vineyards, drive away noxious animals. Some also, having boiled laserpitium and oil, rub the stems of the vines, having begun a little above the

[w] Peony; Matth. iii. 140.

[x] Supposed to be Burdock; Matth. iv. 101 and 102.

the ground. But that caterpillars may not injure vines, rub the pruning-knives with garlic that is well pounded.

XLIX.—AGAINST CANTHARIDES, AND THE LARGER ANIMALS THAT INFEST THE FRUIT.

But that cantharides[y] may not hurt the vines, besprinkle the cantharides with oil, and rub the grindstone on which you are going to set the pruning-knives; but some, to keep off larger animals, macerate canine fæces in stale urine, and besprinkle all things around.

L.—A PHYSICAL PARADOX OF DEMOCRITUS, FROM FREQUENT EXPERIENCE, THAT NEITHER VINES, NOR TREES, NOR CORN GROUNDS, NOR ANY OTHER THING, MAY BE HURT BY ANY, AND ESPECIALLY BY THE LARGER ANIMALS.[z]

Throw a great many river or sea crabs, not less than ten, into an earthen vessel with water, and

[y] Commonly called Spanish flies. They are found in Spain, Italy, France, and some parts of Germany, chiefly in the spring season, on poplar and ash trees. As these trees were used in the *arbustum*, it is likely that the vines of the Greeks and Romans were not a little incommoded by them.

[z] Of the noxious kind.

and having put on the cover, set it in the open air, that it may be insolated during ten days: then what things soever you wish to remain unhurt, besprinkle them with this water, using it regularly until they increase, and you will wonder at its efficacy.

LI.—CONCERNING ŒNANTHE.

You are to gather the œnanthe* from the vine that produces sweet wine, and from the wild vine, and chiefly from the arbustive vine: and you are to gather it in the flowering season, the bunches being indeed taken and dried in the shade: and the flowers being put into a clean jar, you are to pour in a proportionable quantity of old well-flavoured sweet wine. You must wring them carefully with your hands, and reduce them into masses, and lay them by.

LII.—CONCERNING THE MAKING OF THE DRIED GRAPE.

Many things have indeed been said by the ancients concerning the making of the dried grape,

* Flower of the vine. It is often used for the flower of the wild vine, called *labrusca*.

grape, and I have been induced to manage it in this manner. Having twisted the ripe bunches from the shoot, permit them to wither on the vine, and having afterward removed them, hang them in a shade, and lay the dried grapes in a vessel, having strewn vine leaves dried by the sun under them; and when the vessel is filled, lay vine leaves again over them; and having put on the cover, lay them in a repository that is cool and free from smoke; for that which is thus preserved is the [b]dried grape, and it keeps a long time, and it will be very sweet.

LIII.—CONCERNING A REED PLANTATION.

Reeds like situations that lie well to the sun, and they are nourished by the winds: but they are principally planted indeed with roots, for this is the more eligible method of planting them. The reed likewise being laid in an oblique position will easily shoot: let them also that are set be at a due distance from each other, and let them be set to the depth of three or four fingers; and it is necessary that one or two of the eyes of those that are set should look upwards: and it is

[b] Σταφις.

is necessary that those which are planted straight should have two joints, and that they should be planted to the depth of [c]eleven fingers. But the time of planting is, as some say, in the beginning of the spring, since they are so soon hurt by the frost. It is proper to plant them in cooler situations about the autumn. The reed is also out the same year after the winter solstice, for the reed has been thought to increase to that period. They likewise say that the reeds set in the smoke do not breed the worms called *ikes*,[d] which very much hurt the vine; for they say that these animals grow on vines, from reeds that are thoroughly rotten.

[c] *i. e.* Eleven fingers breadth. In some manuscripts it is twelve.

[d] Some of the Greek etymologists say, that there are worms which eat the vines, or the eyes of the vines. In some copies it is ιπες.

BOOK

BOOK VI.

HYPOTHESIS.

These things are contained in this Book, being indeed the Sixth, concerning the select Precepts of Agriculture, comprising the preparation of the press, and of the vats, and of the oil-press, and of the wine-cellar, and the standing of the casks, and the method of making and pitching them, and the preparation for the vintage; and how it is proper to tread the grapes, and how to lay up the must in the casks, and that it may not ferment, and how one may have must all the year, and to know whether it has water, and to remedy it when it is acid; and concerning the using of gypsum.

I.—CONCERNING THE WINE-PRESS, AND THE VATS, AND THE OIL-PRESS.

HAVING finished what we had to say concerning the planting of the vines, and now proceeding to explain the remaining part, concerning the care and medication[d] of the wines, we have thought

[d] By medication, is here meant the cure of the wines that were tainted.

thought it necessary to premise how to prepare the press and the press-vessels. One ought therefore to build the press to receive the abundance of the succeeding fruit, so that there may be sufficient room for the workmen, and that there may be space enough for laying down the grapes, and that in time of necessity it may receive the fruit when pressed, and that the workmen may not be suffocated by the steam of the must. All the press-room ought to be covered on all sides with very fine plaster, and the ceiling not less so, that no filth nor any animal bred in it may fall and taint the wine. Let the press also be kept warm, and let it have plenty of light on all sides; and let the vat have a wide mouth, and let it be washed with sea-water or with hot brine, and let it be wiped with a spunge after it is used, and let it be left without a cover, lest it become mouldy. And since mice sometimes falling into the vat make much ill scent, you are to lay a wide piece of wood, by means of which a mouse may run up when it has fallen in; and when a person is going to use it again, when it is washed and wiped with a spunge in the same manner, let him fumigate it. The oil-press must be also under cover.

II.—CONCERNING THE WINE-CELLAR, AND THE STANDING FOR THE CASKS.

Let the building which receives the casks have a window; in warm situations indeed toward the east and the north, but in such as are colder toward the south. But let the press-vessels be removed from all bad smell; and you are to place the casks so as not to touch each other, having left the distance of a foot between them, that the persons that have the care of the wine-cellar may have easy access to the interior casks, and that, if one cask turn sour, it may not affect the others that are near; for nothing takes infection so soon as wine, and especially the must. You are also to set the casks in dry situations, so that two parts of them may be under ground, if the country produces weak and thin wine, and such as is not nutritious; and if it produces what is powerful and rich[f], the half of them is to be covered. You are likewise to throw some coarse and dry sand under every cask, and you are to strew a due proportion of the sweet[g] rush over this, and you are to fill the rest with mould that has

[f] Και παχος εχοντα, and having a body.

[g] Of the perfumers rush, in the Greek.

has been thoroughly dried in the sun; for sand and dry mould draw all moisture to themselves, both from the ground as well as that which is on the casks, and they make the wine sweet. Any person may prove the power of it thus: for if, having filled a new basket with sand, you pour sour wine into it, it will be percolated pure and without any disagreeable smell; but if you have no sand, you must use such mould as you can have, that is previously insolated. You must not have[h] any thing that has an unsavoury smell in the wine-cellars, as the stink of hides, cheese, garlic, oil, figs, useless vessels; for all such things drawing moisture from the wine become nasty, and they in return impart a disagreeable flavour to the wine. It is also necessary that the wine-cellar should be remote from common sewers, and from the stables, and from a recluse situation, and from the place where the straw is kept, and from the bakehouse, and from the bath. If there are also any trees found near, let them be cut down; for their roots spreading around and raising a bad smell, and especially those of fig-trees, and those of wild figs still more, and those of pomegranates, are perdition to it: and if we live in the country, we are to lay a pavement

[h] Confine, according to the Greek.

ment with brick raised high, and upon the pavement thus laid we are to set the casks, throwing some sand under them.

III.—CONCERNING THE MAKING OF THE CASKS[l].

ALL earth is not fit for pottery; but some indeed prefer the clay of a yellow colour, and some the white, and some mix both together. Some moreover are satisfied with the proof of the cask being well fabricated, if, when touched, it makes a certain shrill and clear sound. This indeed is not all; but it is necessary that the maker should be present at the operation, and that he should previously know that the clay is well wrought, and not to suffer it to be applied to the wheel before the clay indicates the quality of the cask when it is burnt. The potters do not make all casks on the wheel, only the small; they indeed daily fabricate such as are of a larger size, set on the ground in a stove[k], and they make them quite large. But the burn-

[l] In Greek, πιθοι. Notwithstanding they were made of potters clay, I have called them casks, as we thus call vessels appropriated to the holding of liquors. Jar, which comes from the Italian *giarro*, seems hardly adequate to express what πιθος signified.

[k] A hot-house, in the Greek.

ing is not an inconsiderable part of the potter's art: and it is necessary to make the fire neither too small nor too large, but exactly proportionable. For this reason some, declining the difficulty of so much preparation, use the old casks, which is very hurtful to the wines. Of the casks indeed that extrude into belly, those that are long are the best, and especially those that have wide mouths. You are also to make the edges of the casks shelving externally, that when we cover them with ashes[l], nothing may fall into the cask when we open it, but that it may get down on the outside. You are likewise to pitch them immediately while they are hot. But let not the casks be too large; for in such as these[m] the wine does not ferment too much, and which not being too much confined, rises and works, and not only throws out what is ill-flavoured, but the yeast likewise. Small vessels also contribute much to the preserving and to the making of good wine: it is therefore proper to make the casks small. But if we previously have old large casks, let us pour into them the weaker and inferior wine, but that which is of superior quality into such as are small.

IV.

[l] The Greek word implies that the ashes were mixed with something of an unctuous quality.

[m] *i. e.* in such as are not too large.

IV.—CONCERNING THE SEASON AND METHOD OF PITCHING THE CASKS.

You are immediately to pitch the new casks when taken from the hearth, and such as are old, at the rising of the dog-star; and some indeed pitch them every year, and some every other year; but it is better to pitch them when the wine becomes pricked, or when the pitch being laid on is in a state of fluxion.

V.—PROVING OF PITCH.

The ancients have handed down to us that the best pitch is that from Ida; after this, that from Pieria[n]. But some prefer the Rhodian, and some the Rhætæan[o] pitch: and generally that which is shining is of superior quality; the more it shines, the better it is; but that which is thin, is rejected as being good for nothing. Some indeed, having heated it, pour it into water, and they prove it not only by the smell, but by the taste also: and that also which in boiling does not fly[p] or rise in bubbles,

[n] This was in Macedonia, on the Sinus Thermaicus.

[o] Ροιτεια was a city of Troas; Strabo, lib. xiii.

[p] *i. e.* burst with explosion.

bles[q], or is not turbulent, has been approved as very good. That also which is of a sweeter taste, and more pure and more smooth than common, and of a good smell, is of superior quality; and pitch that has been boiled is better than that which is raw, and that which is dry than that which is moist; but the best pitch is prepared in this manner: it is put into an earthen vessel, and it is put over a small fire in the sun, then some hot water percolated through wood-ashes is poured on it, and the pitch is stirred; when it has afterward stood, it is poured out after two hours, then there is as much water again poured in. Having therefore done this thrice every day for three days, and having taken up the moisture on the surface, they make the pitch that is left exceedingly good. Dry pitch is also bitter, but being boiled with wine it becomes more useful; and especially if any perfumes are boiled with it, it will be better; and having boiled the mixture to a third part, they use it as properly qualified: but some throw wood-ashes into it, and boil it down, and they also add wax to the ashes. Some likewise pour a lixivium of ashes and old wine into it. Some put in wax by itself; and they mix that which comes from Sardinia, for they say this

is

[q] Or make a noise, is the Greek expression.

is more eligible; and some indeed melt a fourth, and some a sixth, and some a tenth part; for if we wish to make the wine more harsh, we are to throw in more wax. But some advise not[r] to throw any wax into the pitch, for the wine becomes more bitter, so that it soon turns sour.

VI.—COMPOSITION OF PITCH.

In Italy they use pitch of this kind: forty minæ[s] of pitch, one of wax, eight drams[t] of sal ammoniac, six drams of manna[u]. Thus, having pounded them and boiled them together, they sprinkle eight ounces of well-ground fenugreek over them, and they pitch the cask with them when they are well mixed. Others indeed use this: a pound of dry pitch, fifteen minæ of wax, three pounds of ground vetches and wheat, an equal quantity of well-dried fenugreek pounded and

[r] A figurative signification of the word *sincerity*, looks as if it alluded to this circumstance, and it seems to be fabricated from the words *sine cerâ*.

[s] The common Attic mina was 11 ounces, 7 pennyweights, $13+\frac{5}{7}$ grains.

[t] The drachma of the Greeks consisted of 6 oboli: it was 2 pennyweights, $6+\frac{9}{14}$ grains.

[u] Called Λίβανωτος; Matth. i. 72.

and sifted, five pills[v] of *calamus*[w] *aromaticus*, and of the leaves of *malabathrum*[x]; having melted the ingredients that may be dissolved, and having pounded such as are dry, they sprinkle over them half a mina of sifted hepatic[y] aloes. This pitching is the most approved which will strengthen weak wines, and it preserves those that are apt to turn in a state of integrity, and it makes them well-flavoured.

VII.—GENERAL PRECEPTS ABOUT PITCHING.

In all the ways of pitching it is best to wash the pitch with a lixivium of ashes, and to mix it with resin of the lentisc or of the pine; but if you have not this, it is proper to mix such as you have, and a proportion of iris and of fenugreek, for the fenugreek makes the wine more powerful and of a better body; and some *costus*[z], and *cassia*[a], and *melilot*[b], or the flowers of *schoinos*,

[v] Σφαιρια.

[w] Sometimes called *calamus odoratus*, sweet-scented flag; Matth. i. 17.

[x] It is called the Indian leaf; Matth. i. 11.

[y] The common aloe is so called.

[z] Matth. i. 15.

[a] Παρα το κασαι, from its fragrance; Matth. i. 12.

[b] Called also *sertula campana*; Matth. iii. 41.

schoinos[c], for these contribute to a pleasantness of flavour. But in general it is expedient to use various[d] modes of pitching, when wine is good and well made[e]: and in respect of wines that are not expensive, it is necessary to be satisfied with good pitch, and to throw in a moderate quantity of iris and fenugreek, and a much smaller quantity of wax; for more being thrown in, turns the wine[f], as we have already said. It is indeed necessary to use white wax, or if not white that which is clean. Some do well, and set a reed and a piece of wood straight in the empty casks, that the small flies or animals of this kind, falling in, may have the means of ascending by these. It is not proper to pour the best wine into casks that are just pitched, but that which is turned, for[g] it will make it better: and you are to pour likewise the black wines into such as these, and the white into such as have been pitched two years or even more.

VIII.

[c] By Columella called *schœnum*, xii. 10; it is the *juncus odoratus.*

[d] *i. e.* pitching made of various ingredients.

[e] Made in an agricultural manner, in the Greek.

[f] In cap. v.

[g] As, in the Greek.

VIII.—ANOTHER APPROVED METHOD OF PITCHING.

Mix two pounds of Cretic or of Campanian hyssop, two pounds of Indian or of Celtic[h] nard, half an ounce of good aloes, half an ounce of Sicilian crocus, a pound of Illyrian iris. After the pitching of the casks, according to the measure of ten amphoræ, apply in due proportion to the sides and under the edges pitch that is neither very cold nor too hot, lest the preparation be scorched. Then pour in the new wine; and having tasted it, in a few days you will imagine that it is of a good flavour and old. Pitch the casks also according to custom, either every year or regularly every other year, using the proportion and composition of ingredient[i] as it has been prescribed.

IX.—CONCERNING THE STOPPING OF THE CASKS.

Some persons, after the pitching, a short time before the tunning of the must, smear the casks; some

[h] Sometimes called *spica celtica.* The dried roots are now brought into England from the Alps; Matth. i. 7.

[i] Φαρμακȣ; of medicament, literally.

some indeed the mouths only, but others smear the lids. But the stopping is with pitch, with sapa[k], and sea-water. Some indeed, having poured tar and brine into the sapa, and having mixed them, smear the mouths of the vessels with a spunge; but others cover the lids with amurca[l] only.

X.—CONCERNING THE PREPARATION FOR THE VINTAGE.

You are to open the presses twenty days before, that[m] they may be aired, and you are to besprinkle them with sea-water, and you are to suffumigate them.

[k] Some of the Latin writers say that it was sweet wine boiled down to half of its original quantity. Palladius says it was boiled down to a third part, lib. xi. 18.

[l] The watery sediment of the olive oil.

[m] Ινα διαπνευσωσι; that they may transpire.

XI.—WHAT THEY WHO HAVE THE CARE OF THE PANNIERS OUGHT TO DO; AND HOW THE GRAPES ARE TO BE TRODDEN; AND IN WHAT MANNER THEY WHO ARE APPOINTED TO TREAD THEM, MUST CONDUCT THEMSELVES IN THE PRESSES.

LET those who preside over the larger baskets, that are called panniers, pick the leaves, and if any sour grapes are brought, or any dry bunches are found[n]. They also who tread, must pick them, if any thing has escaped those who preside over the baskets; for the leaves being pressed with the grapes render the wine more rough, and apt to spoil; and from sour and dry grapes there arises consummate harm. Let those who are appointed for this purpose, immediately press with their feet the grapes that are thrown into the presses, and having equally trodden all the grape-stones, let them take up all the kernels, that is, the refuse, so that the greatest part of the liquor may run into the vat; and when they have trodden them a second time, let them be removed;

[n] Εκλεγετωσαν, *i. e.* let them pick them, seems to be understood after this word.

removed; and having made the kernels warm and not too moist, let them then lay them under the press board, for being warm and tender they become more fluid. But if they are set under very wet, it is necessary that being laid together they should be broken, a weight being laid on them. The men that tread indeed must get into the press, having[o] thoroughly cleaned their feet, and none of them must either eat or drink in the press, nor must they get in and out frequently; and if there is any necessity of going out, let the person not go with naked feet. The men that tread ought also to be dressed[p], and to have their girdles, on account of the violent sweating. It is likewise proper always to think of suffumigating the presses, either with frankincense, or with some other sweet odour. It is indeed proper to know that the *stemphula*[q] are not the insides of the olives only, as some persons think, but they are also applied to the refuse of the grapes. If therefore you hear the word, bestow attention on

[o] Having well cleaned the parts about the feet, is the Greek expression.

[p] To be full dressed, in the Greek.

[q] Στιμφυλα signifies the same thing as *γιγαρτα*, as well as the kernels of the olives.

on the subject, as indeed the grape-stones are sometimes so called, and sometimes the inside of the olive is thus denominated.

XII.—HOW THE MUST IS TO BE POURED INTO THE CASKS AFTER THE TREADING OF THE GRAPES IS FINISHED.

It is proper that the casks should be washed with a spunge with genuine brine before the must is tunned, and that they should be fumigated with frankincense. It is also necessary to fill them neither too full nor yet too sparingly, but to form a conjecture how much the fermenting must is likely to increase, that it may not work over, and that the froth rising to the edges, it may get rid of what is impure only: it is also proper to skim the must in the casks regularly for five days with your hands, and with skimmers, and to take away the froth, and any thing else that may be superfluous, and to remove all the filth about the casks, and to convey it to a considerable distance; for if all this remains near, small flies are bred from it, when it is putrefied, and there arises a bad smell, both which make the wine turn. It is moreover proper to think of keeping the presses sweet by suffumigations, and especially in the wine-cellar.

XIII.—THE GRAPE-STONES BEING IMMEDIATELY THROWN OUT AFTER THE DRAWING OF THE MUST FROM THE PRESS, HOW WHAT IS CALLED THAMNA MAY BE MADE OF THEM.

The refuse, that is, the kernels, are immediately to be thrown out after the draining of the must, and they are to be put into casks, and to be trodden down; for the inferior[r] wine from these, which they provincially call *thamina*, is not an unpleasant drink for the labourers, and the kernels that are remaining will afford proper nourishment to dumb[s] creatures. It is also necessary, when the grape-stones are taken out of the press, immediately to rinse the press and the press-vessels, and to wash them with sea water or with brine, and to fumigate them; for the moisture that is left turns quite sour, and it will spoil the fruit trodden the following day, and it breeds small flies, which is a sign of the wine being turned.

[r] Τξυξ. It was somctimes called *δευτεριας*, and by some of the Greeks *σεμφυλιτης*, and by some *ποτιμος* and *θαμινα*. The Romans call it *lora*.

[s] Αλογοις.

XIV.—THAT THE NEW WINE MAY NOT WORK OVER.

Let us lay a chaplet of pulegium[t], or of calamintha[u], or of origanum[v], around the necks of the vessels: and some rub the inside of the casks about the edges with cheese made of cow's milk; for it will keep down the fermenting[w] new wine.

XV.—TO RENDER THE NEW WINE FIT FOR USE.

Pour into a measure a cotyla of sweetish[x] vinegar, and after three days it will be clear: but concerning the fining of new wine more expeditiously, you will find the best means in the third book of Diophanes.

XVI.—TO HAVE SWEET WINE ALL THE YEAR, AND TO KNOW WHETHER IT IS DILUTED.

Before treading the grapes, pour the liquor that drops voluntarily from them, the same day, into a vessel pitched within and without, so that the vessel

[t] Penny royal.

[u] Calamint; Matth. l. iii. c. 36.

[v] Matth. iii. 28.

[w] Γλευκος; literally, sweet wine.

[x] Οξυς γλυκαζοντος. This was made from honey. Galen, comment. iii. p. 572.

vessel[y] may be half full, and stop it carefully with gypsum, for the must remains exceedingly sweet for a long time: but it will be preserved still better, if, the vessel being stopped with a skin, it be thrown into a well during thirty days, for, on account of its not fermenting, it will always be sweet. If any one will likewise tread the grapes gently so that they may not be pressed hard, he will have this kind of must fit for use for a considerable time. Some pour the must into old vessels, that have had old wine in them. Some place the vessel pitched within and without, as it has been already mentioned, in a fountain, so that the edges only may remain out: and this has been proved to be very useful. Some bury the vessel in moist sand. Some dig and keep wet sand on[z] the grape-stones; others, putting the must in a vessel that is not pitched, and having pounded some Alexandrian[a] nitre, lay it in a

 shady

[y] The Greek says vessels, which does not seem to be accurate.

[z] They first covered the vessel with the grape-stones, and they then heaped on the wet sand.

[a] See Pliny, lib. xxxi. 10; and Dioscorides, lib. v. Matth. v. 89.

shady place. But if the must is diluted, you will find it in the following chapter.

XVII.—TO KNOW IF THE MUST IS DILUTED.

THROW some wild pears, that are very sour, into the must; and if it is mixed with water, they go to the bottom; but if it is not, they swim.

XVIII.—CONCERNING THE PREPARATION OF GYPSUM.

YOU are to put the gypsum in a wide vessel, and you are then to pour on so much must that it may cover the gypsum; and you are to move it frequently, and you are thus to permit it to subside, that the grosser parts of the gypsum may fall to the bottom: and you are to take[b] up the superficial part of the must, so that none of the gypsum may be mixed with it, in the act of removing it.

XIX.—TO AID MUST THAT IS GETTING ACID.

YOU are to pour into the amphora some dried grapes, macerated until they swell, and two

cotylæ

[b] To draw up, in the Greek.

cotylæ of pressed grapes; or you are to percolate it through river[c] sand, as it has been already mentioned: or you are to throw in four drams of Sandyx[d].

[c] I believe the passage referred to, does not express *river* sand; c. ii.

[d] Sandarach, probably. A sort of arsenic is in modern times brought into England from Africa, under this denomination. See Pliny, xxxv. 23. Matth. v. 81.

BOOK VII.

HYPOTHESIS.

These things are contained in this Book, being indeed the Seventh, in relation to the select Precepts of Agriculture, and comprehending a Treatise on the difference of Wines, and concerning the cure of them, and the tasting of them, and the transferring of them into other vessels; and other useful things.

I.—CONCERNING THE DIFFERENCE OF FRUIT.

HOLLOW situations produce much wine, and what is faulty; but such as are high yield what is better, the fruit being indeed matured by the winds, and by the temperament of the air, and especially by the sun's power; for the sun not only makes the grapes more powerful, but more sweet likewise, if it throws much heat on them. But the moon being warm and moist, only matures the grapes, and the night only renders them sweet. There is therefore a want of much insolation, that the wine may be durable, which the sooner it

comes

comes to perfection, the sooner it also evaporates[e]. The fruit also coming from warm situations makes the wine more durable; but that which comes from other parts, or from such as are ill cultivated, makes the wine languid and weak. If the vine produce few grapes, it makes the wine more powerful, because it bestows all its strength and power on that fruit exclusively.

II.—TO WHAT WINES A PLACE IN THE OPEN AIR MAY BE ADAPTED, AND TO WHAT SORTS SUCH AS IS UNDER COVER.

You are to place the more powerful wine in the open air; but let it be averted from the west and from the south, by some walls built[f] before it: but you are to set the thin wines under cover, and it is necessary to make the windows higher, turned to the north and to the east.

III.—CONCERNING THE DIFFERENCE OF NEW AND OLD WINE, AND OF THAT FROM THE WHITE AND BLACK GRAPE.

The black grapes will produce more powerful wine; the white, that which is middling. The

P 4 new

[e] Transpires, in the Greek.

[f] Placed, in the Greek.

new wine is very cold, and the old is very genial[g], and very powerful, and very well flavoured, for time consumes[h] what is watery in it.

IV.—HOW ONE IS TO CURE, AND TO RENDER DURABLE, THE WINE OF GRAPES THAT HAVE BEEN TOO PROFUSELY WETTED WHILE ON THE VINE, AND OF THE GRAPES LIKEWISE WETTED AFTER THE VINTAGE.

If, when the year is rainy, it happens that the grapes on the vine are too much wetted, or if it so happens after the vintage, when violent showers fall, that they are more than sufficiently irrigated, we are necessarily to tread them. If you also understand that the must pressed after the vintage is too weak, and the taste will discover this when the wine is poured into the casks, and[i] it has fermented the first time, let[k] us immediately remove it into other casks (for all the gross sediment remains at the bottom on account of its gravity), throwing three cotylæ of salt to ten measures

[g] According to the original meaning of the word in Arabic.

[h] Αναλισκει, takes up.

[i] Και την πρωτην ζεσιν ζεση; literally, "and it has fermented the first fermentation". *Orientalism.*

[k] The transition as in the original.

measures of wine: but some, acting with more useful propriety, boil the wine till a twentieth part of it is boiled away, throwing[1] in a hundredth part of gypsum. The Lacedemonians let their wine remain so long on the fire till the fifth part is boiled away, and they use it after four years.

V.—CONCERNING THE OPENING OF THE CASKS, AND WHAT IT IS PROPER TO OBSERVE AT THE TIME OF THE OPENING OF THEM.

It is proper to open the casks when you have observed the rising of the stars, for then the wine is in a degree of commotion, and it is not right to touch it: and if you open a cask indeed in the day-time, you must observe the sun, that its splendour may not fall on the wine: and if you are to open a cask in the night, necessity often pressing it, it is proper to attend to the light of the moon.

[1] Palladius mentions this, Oct. xiv. 4.

VI.

VI.—CONCERNING THE MOVING OF WINE FROM ONE VESSEL TO ANOTHER; AND WHEN IT IS PROPER TO RACK WINES; AND THAT WINE THAT HAS BEEN POURED INTO THE SAME CASK, DIFFERS.

It is proper to remove the wines from one vessel into another when the northern winds blow, but by no means when the winds are from the south; and the more weak wines indeed, in the spring; and such as are more powerful, in the summer; but such as are in dry situations, after the winter solstice. But the wine that is removed into other vessels, when the moon is full, becomes sour; and it is proper to know that wine separated from the lees, which nourish it, becomes thinner and weaker. You are moreover to provide that it may be kept warm indeed in the winter, and that it may be cool in the summer. It is also necessary to remove it into other vessels when the moon is increasing and under the horizon: but Sotion says that it is necessary to remove it at the *interlunium*, that is, on the first and second day before the moon becomes apparent to the human race. It is also proper, when we remove the wine from the casks into small

small vessels, to observe the rising of the stars; for the lees ferment at their rising, and particularly when the roses are in flower, and likewise when the vine is shooting. But men of prudence advise, and particularly Hesiod, when the cask is opened, to use the wine at the top of the cask and that which is toward the bottom, and to keep the wine in the middle of the cask, as more powerful and more durable, and calculated for age; for the wine indeed toward the mouth of the cask, as usually exposed in some measure to the air, is more languid, having transpired; and that which is toward the bottom is soon turned, as being near the lees. But Hesiod thus expresses it:

> [m] "From the cask's top, and from its bottom, swill;
> "The middle spare."

But it is necessary that the person who removes wine into the jars should not fill them to the edges, but a little below the neck, that they may not be destroyed[n], but have vent. It is also necessary that the casks that are emptied should be immediately covered with brine, or with wood ashes, or with cimolia[o], or with potters earth.

VII.

[m] Αρχομενυ δε πιθυ και ληγοντος κορεσαθαι
Μισσοθι φειδεσθαι.

[n] Suffocated, in the Greek.

[o] A kind of chalk, from Cimmolus, an island in the Ægæan Sea; Pliny, lib. iv. c. 12; and l. xxxv. 57.

VII.—CONCERNING THE TIME AND MODE OF TASTING WINE.

Some indeed taste wines when the northern winds blow, for the wines then remain motionless and clear: but empiric wine-triers taste wine rather when the south wind blows; for the south wind particularly sets the wine in motion, and it convinces one what quality it is of. It is not proper that a person should taste wine fasting, for the taste is dull, nor yet after drinking wine, nor after a hearty meal. The person that tastes ought to taste neither victuals that are stimulating nor too salt, nor such things as deprave[p] his taste, but having eaten very sparingly and having well digested it. But it is proper to afford the buyers a taste when the north winds blow. Some wishing to have a good laugh, at the expence of the buyers, have a new jar, which they wash with very good, and old, and very well-flavoured wine, for the quality remains on it for a long time, so that one might think it to be the fragrance of wine lately poured in, and they thus deceive the persons that taste. Some innkeepers also, who are more cunning, lay cheese and nuts in the

wine

[p] Change, in the Greek.

wine-cellar so as to attract the persons that get in to eat of them, that the perfect sense of tasting may be falsified. These things have been written by me, not that we may practise them, but that we may not suffer from imposition. But the farmer ought to taste his wine often, the new and old; that the wine which is going to turn,[q] may not escape him.

VIII.—CONCERNING THE PROVING OF WINE AND MUST, IF IT HAS WATER.

It is necessary for the master often to trust wine or must to the curators or to the servants; it is also necessary that the buyer should prove if the wine is genuine. Some therefore throw an apple into the vessel, but it is better to throw in wild pears: some throw in a locust, and some a cigale[r], and if these indeed swim the wine is genuine; but if they sink, it[s] is diluted. Some also immerse in the wine a reed rubbed with oil, or papyrus, or a dried stalk of grass, or any dry twig;

[q] Φευγειν, to fly.

[r] The Greek name of this animal is τεττιξ, in French *cigale*. Some have given it the name of the *baulm cricket* in English.

[s] In the sense of the Latin word *diluo*, which signifies to mix with water.

twig; having also rubbed them with oil, and having then wiped them, and taking out the reed, or any of the other things immersed, they make the proof; for if the wine is diluted, drops of water will stick on the oil. Some likewise, making a more simple experiment, pour the wine into a new pot that has had no moisture in it, and they hang it up during two days, for the pot will leak when water is mixed with it. Some also, heating the wine, pour it into a new pot, and they set it in the open air; if therefore it is diluted, it turns to vinegar. Some also pour the wine on what is called *titanos*, that is, a limestone; and if the wine is mixed with water, it will penetrate the stone; but if it is genuine, it will fix[t] the stone. Some pour the wine into a frying-pan having hot oil, and if it is mixed with water it will raise bubbles and make a noise, and it will fly up with elastic power. Some likewise having wetted a new spunge with oil, stop the mouth of the vessel and invert it, and if it[u] is diluted it will run through the spunge. We also use the same proof with regard to oil.

[t] *i. e,* deprive it of volatility,

[u] It refers to wine.

IX.

IX.—TO SEPARATE WINE FROM WATER.

Pour liquid alum into the jar[v] of wine, then stop the mouth of the jar with a spunge imbued with oil, and having inclined it, suffer it to run out, and the water alone will run out.

X.—AT WHAT TIMES THE WINES ARE USUALLY TURNED.

All wine mostly turns acid about the setting[w] of the Pleiades, and about the winter solstice, or when the vine blossoms, and about the summer solstice, and under the heat of the dog-star; and generally about all the accessions[x] of heat and cold, or of much rain, or on account of much wind, or violent thunder, or at the season in which the roses blow, or from strong lightning.

XI.—THAT WINES MAY NOT BE TURNED, UNDER THUNDER AND LIGHTNING.

Iron set on the covers of the casks keeps off injury from thunder and lightning. But some lay on branches of laurel by way of prevention.

XII.

[v] Κεράμιον.

[w] About the sixth of the ides of November.

[x] Επισημασιαις, signs or indications.

XII.—HOW ONE MAY PREVENT AND NOT SUFFER THE WINES TO BE TURNED, BUT THAT THEY MAY BE DURABLE.

Parched salt thrown into the wine prevents it from turning; and it hinders it from fermenting more than what is necessary[y], and from producing too great a head. Sweet almonds thrown into the black wines preserve them a long time. The dried grape, the kernel being taken away, macerated in must or sapa, and with sand, makes the wine rich and durable. But some prefer the grape that is spontaneously dried on the vine, and they use it alone without any other preparation. Gypsum, thrown in at the beginning, indeed makes the wine more stimulating, but in time the stimulating quality is sure to transpire; still the utility of the gypsum remains a long time; and fenugreek parched in the sun, if it is pounded and mixed with the wine, makes it keep, and does not suffer it to turn. Wines that are turned, being separated from their own lees that are vitiated, and poured over the lees of sound wine, will keep. But some having lighted torches, or having made iron red hot, extinguish them

[y] Καὶ ἀφρὸν πλείονα ἐπιγίνεσθαι, and more froth to arise.

them in the must, and they do not permit the wine to turn sour. Some also, throwing the parched fruit of cedar and parched acorns[z] into the wine, render it durable. Some, having burnt the stone denominated *porinos*[a], apply it to the wine. Others, having pounded and mixed the ashes from burnt shoots of the vine and fennel seed, mix them with the wine. Some also pour the wines that are turned into vessels that are recently pitched, and they remove them into another building; for, if indeed they have been hurt by heat, they lay them in cool places; but if by wet and cold, they remove them into warm and dry places. Others, having burnt the seed, or some of the substance of the oak, throw the ashes into the wine; and some, mixing milk and honey, pour them into the must. Some also, having burnt and well pounded oyster shells, throw them into the wine; others, having burnt the kernels of the olives, extinguish them with well-flavoured old *defrutum*, and afterwards pounding them they pour them into the wine. We shall make wine durable by applying the roots of the vine to the must. Potters clay also,

 thrown

[z] Κηκῖδας, seeds of the oaks called *quercus* and *robur*.

[a] Theophrastus says this stone was like Parian marble in colour and density, lib. *de Lapidibus*.

thrown in after the wines have fermented, fines them, bearing along with it what is turbid down to the lees, and the more so if it is parched; and it makes the wine have a good flavour, for it is sweet: and[b] the animals that feed on it in the winter live by it. Distilled oil, with sapa poured in, makes the wines more durable, and those that are weak more powerful. Black and white hellebore, moderately applied, fines wine, and it makes it durable, and it is of utility to them that use it. Black vetches moderately parched, and ground, and mixed, render wine lasting and diuretic. Sapa mixed with wine makes it durable. Wax mixed at the pitching makes wine have a harsher taste. Linseed mixed with sapa or must makes the wine durable. The flour of the white vetch preserves wine. Brutian[c] pitch, that is, what is found at the bottom of jars, pounded and sifted into the wine, makes it durable. Resin of the pine, and particularly that of the

[b] It is supposed that serpents fed on it. Virgil mentions a chalk of this kind.

.... et nigris exesa chelydris
Creta ....

Georg. ii. 214.

[c] The Brutii inhabited that part of Italy now called Calabria, near Regio.

the terebinthus, preserves wine. Scissile[d] alum makes wine astringent and durable, and it stops it when it is turning acid.

XIII.—AN ADMIRABLE PREPARATION, MAKING WINES DURABLE, CALLED PANACÆA.

Have these specifics in readiness: two ounces of aloes, two ounces of frankincense, two ounces of amomum, three ounces of melilot, one ounce of cassia, two ounces of spikenard, three ounces of the Indian leaf[e], two ounces of myrrh; having tied all these in a linen cloth, put one spoonful in each cask after the wine is poured into it, and after it has done working, and move it with the root of a reed during three days. Some indeed medicate their wines in this manner: they put in three scruples[f] of crocus (for this makes the wine

[d] This was the alum of the ancients. It is formed by the evaporation of water that has passed over beds of alum. Matth. v. 133.

[e] Sometimes called *malabathrum*. The Greeks distinguished it by the name of φυλλον. Matth. i. 11.

[f] The Greeks called a scruple γραμμα, because it was $\frac{1}{24}$ of an ounce, as the word, literally taken, is $\frac{1}{24}$ of the Greek alphabet. The Romans seem to have copied the idea with much fidelity in the term which they use to express the same thing.

wine of a good colour), four scruples of male frankincense sifted (this makes the wine rather harsh), one pill of the Indian leaf (for it gives it a good flavour); mixing each of these when pounded and sifted, and having sifted them a second time, they put three spoonfuls in each amphora, when the wine no longer ferments, but is without motion: and observe this particularly in respect of all wines, that you are to medicate them when they are still[g]. But others medicate their vines thus: they pound and sift equal quantities of all these, and pour them into the wine: cardamomum, Illyrian iris, cassia, spikenard, melilot, xylobalsamum[h], Alexandrian rush, costus, Celtic nard. Some indeed, boiling must and reducing it to a third part, mix it with the wine; some also throw in gypsum.

XIV.—AN EFFICACIOUS INSCRIPTION, THAT THE WINE MAY NOT TURN

The wine cannot possibly turn, if you inscribe on the vessel or on the casks these pious words: "Taste[i], and see that Jehovah is good;" and you will

[g] *i.e.* when they are not fermenting.

[h] See Matth. i. 18.

[i] This seems to be translated from these words:

טעמו וראו כל טוב להוה

will do right if you inscribe this on an apple, and lay it in the wine.

XV.—INDICATION AND PREVIOUS TOKENS OF WINES THAT TURN, AND OF SUCH AS ARE DURABLE.

You are gently to remove the wine that has been poured into the cask, into another vessel, after some time, and you are to leave the lees in thecask, and you are to stop it carefully. You are then frequently to examine by smelling, whether the lees are at all turned, or small flies[k] are produced, or any thing of this kind, for they are indications that the wine will be infected; but if nothing of the kind happens, entertain[l] good hopes of the wine. Some indeed, having a reed straightway perforated, let it down to the lees at the bottom, and stopping the upper end of the reed with the middle finger, and after some time removing it, they by means of smelling attract the savour from the lees at the bottom; they then, by means of sucking, draw up some part of the lees, and they judge[m] according to the quality of the

 lees,

[k] Κωνωπες; literally, gnats.

[l] Have confidence in, is the Greek expression.

[m] Conjecture, in the Greek.

lees, of the future quality of the wine. Some also having heated a little of the wine, and having afterwards cooled it, taste it, and they believe that, as it is found in taste, so will the rest of the wine be. But it is necessary that the experiment in tasting be made from the middle of the vessel. Others form their judgment from the covers of the vessels; for the cask being uncovered, they taste the moisture on the inside of the covers, and they judge that the wine will be of the same quality; for when the taste indeed is of a good vinous flavour, it is a sign that the wine is very good; but when it is watery, it is not to be depended on. Some likewise make a proof from the taste of the wine; for if it is of a rough taste from the beginning, it is a sign of soundness; but if it is of a faint taste, it is quite the contrary. One may also prove wine from the head[a] that lies and swims on it. If the head is of a purple colour, spreads wide, and is mellow, the wine is the sounder; but if the head is glutinous, it is not good; and a head that is of a black or yellow colour, is an evident sign that the wine has no strength; but when it is white, it

[a] This in the Greek is ανθος, that is, flower, or the fermenting substance, which indicates that the wine is advancing towards maturity. It was, by the Romans, called *flos vini*.

it is sound; and a head that resembles a spider's web, is a previous sign that it will soon turn sour. Again, if you see a serpent entwined around the vine at the time of the vintage, you are to expect that the wine will turn acid; but if the must is thick and glutinous, and you may prove this by touching it when the wine is trodden or put into the cask, the wine will be the sounder; but if it is thin and without strength, it will soon turn. The wines also that are rough in the must are the more durable, and toward the last they are better-flavoured; but the wines that are sweet and delicate at first, are of short duration: and the vessel that holds wine that is turning, seems to feel warm to the touch; but the vessel that contains durable wine is cold. If the wine indeed seems to taste warm in the spring, it will soon turn; but if it is cool, it will be durable. If the cover of the cask is found always dry, it indicates the wine to be very sound; but if moist, it is a sign of turning. If the wine has the savour of sharp mulsum, conclude that the cask is the cause of it, and it is then proper to remove it into another cask. Some thus prove whether wine is sound: having immersed their hands in the wine, they judge from the smell when they are dry, for the smell of the wine that is turned, seems to be more

acid. Some pour the wine into a vessel with a narrow mouth, and having stopped it very close, they set it in water during three days, and they then take it up and prove it. Some pour the wine into sand, and having percolated it, if it does not change, they judge it to be quite proof. Wines indeed usually turn at the solstices, and when the vine begins to bud; it is therefore necessary to prove them at those periods. Others prove wine thus: having made thin plates of lead, or of tin, or of brass, of the length and breadth of three fingers breadth, observing that they are very clean, they stick them to the cover of the cask with wax, and they lay the covers on, and after forty days they open the casks; and if they find the wines have a head, and they smell sweet and grateful, and all the plates clean, they conclude that the wine is sound; but if it is going to turn, you will find the plate of lead become white, and having flakes of the appearance of *ceruse:* if it is the tin, and the wine is going to turn, you will find a kind of sweat on the tin, that is black and of an acid taste; and if it is the plate of brass, and the wine is sound, you will find it clean and splendid as it was when set on; but if the wine is going to turn, you will find the plate of an unsavoury smell, and having bubbles on it. Some mix barley-

meal

meal[o] with it, and taste it when it has stood some time. Some throw parsley-seed, and bran[p], and laurel leaves, and shoots of the black vine, into the wine when boiling and extremely hot; and when it is cold, they taste it, and they prove it in this manner.

XVI.—HOW ONE MAY CURE WINE BEGINNING TO TURN SOUR.

HAVING filled a new pot with good water, and having carefully stopped it, let it down into the cask, then stop the cask, giving it a little vent, and after three days you will find the wine quite sound, but the water of a bad smell; do this until the wine is perfectly sound. But some pour a fiftieth part of goats milk into the wine, and cover it during five days; and they afterwards pour out the wine into another vessel, and cover it during ten days, and the wine does not turn.

XVII.—THAT WINE CARRIED OVER SEA MAY BE DURABLE.

HAVING percolated amurca through a cloth, and having boiled it to half its quantity, pour it

with

[o] Αλφιτον.

[p] Bran of barley, in the Greek.

with some Attic honey into[q] the jar, before the wine is poured in; for it keeps thus a very long time.

XVIII.—HOW YOU ARE TO MANAGE THE VINES, THAT THEY MAY PRODUCE SWEET WINE.

Some render the wine sweet in Bithynia in this manner: they twist a fruit-bearing shoot thirty days before the vintage, and they take off all the leaves, that the sun may dry up all the moisture, and that it may make all the wine sweet, as we do when we boil it; but they twist the shoots for this reason, that they may keep the grapes from the moisture and nourishment of the vine, and that they may by no means receive any moisture from it. Some also, after they have freed[r] the bunches from the leaves, and when the leaves begin to be wrinkled, gathering them successively, expose them to the sun, until they are all thoroughly[s] dried; and taking them afterwards to be insolated in the same manner, they remove them into the press, and they let them remain the rest of the day and all the following

[q] To the bottom of the jar, in the Greek.

[r] Denudated, in the Greek.

[s] *i. e.* become as the *uvæ passæ* of the Romans.

lowing night, and they tread them early in the morning.

XIX.—HOW WE ARE TO MAKE SWEET WINE FROM MUST.

If you wish to make the wine that is pressed[t] sweet, after pouring the must into the casks, suffer the casks to be without their covers three days, and then lay on the covers, not altogether close on the edges of the casks, but a little suspended, some sticks or reeds being laid to support them; but after the fifth day it is proper to lay the cover on close, being smeared with ashes mixed with water, small vent-holes having been left; and after the seventh day you are likewise to stop the vent-holes; but if you wish your wine to be sweeter, let your casks remain uncovered during five days, and after the fifth day lay the covers on, as it has been already mentioned.

XX.—TO MAKE WELL-FLAVOURED AND SWEET WINE.

Having gathered a few ripe myrtle berries, dry and pound them, and throw them into[u] the chœnix,

[t] Trodden.

[u] Εν τω καβω, into the cab, which was an eastern measure, equal to the Greek χοινιξ, = $3\frac{1}{3}$ pints + 0.844 sol. inches.

chœnix, and suffer them to remain during ten days, and then open and use them. You will also have well-flavoured wine, if you macerate fruit[v] in water, and take it out, and pour the water into the wine; and the fruit will be fit[w] to eat. Œnanthe also, especially from the arbustive vines, taken and applied in the blowing season, makes wine well-flavoured; and the cask fumigated with wax affords a good savour. We shall likewise make wine of a better flavour by rubbing the edges of the cask with leaves of the pine and of the cypress, and by stirring the must. But if you wish the wine to have the flavour of suffumigation, either of fruit, or of any thing else, put in one of the fore-mentioned ingredients before you pour in the wine, and having tied it, let it remain as long as it is sound and its smell is not changed; then remove it, and pour in the wine, and having stopped it, then use it. These things likewise produce a good flavour: abrotonum, bitter almonds, potters clay, the leaves of asarum[x], the roots of aspalathus, the flowers of asparagus, the saw-dust of cedar, the flour of fenugreek. It is necessary to suspend some

[v] The original mentions Asiatic fruit.

[w] Pleasant, in the Greek.

[x] In Spanish *asarabacara*, Matth. i. 9.

some of these in small baskets, and some tied in cloths, high in the vessel containing the wine, so that they may not touch it; and when they have imparted their flavour, they are all to be taken away, before they are corrupted and changed.

XXI.—TO MAKE WHITE WINE BLACK, AND BLACK WINE WHITE.

MIX eight drams of[y] drossy salt with ten cotylæ of black wine. The serum of milk poured into wine has the same effect: and if any one pours the ashes of sprays of the white vine, when burnt, into a vessel, and having stirred them, lets them remain in the vessel during forty days, the wine will be white; and the white wine will be black, when ashes of the sprays of the black vine are poured in.

XXII.—TO FINE WINE.

POUR the whites of three eggs[z] into a vessel, and stir them until they froth, and throw in some white

[y] *Αλος ρυπαροῦ.*

[z] Maimonides says that the nature of eggs is such, that when poured into things that are turbid, they fine them, and separate the gross from the subtile parts. *Schabbeth*, c. xx. s. 2.

white salt, and a proportionable quantity of wine, and work it until it is very white; then fill the vessel with the wine, and do this to every jar, and set it by.

XXIII.—TO MAKE WINE STRONG FOR MIXING WITH WATER, SO THAT A LITTLE OF IT, WHEN TAKEN, MAY BE SUFFICIENT FOR MANY PERSONS.

GRATE the dry roots of althæa[a] into the wine, and when you have stirred it, use it.

XXIV.—TO MAKE NEW WINE APPEAR OLD.

HAVING mixed a cyathus[b] of bitter almonds, of absinthium, of the leaves of the fructiferous pine, after they have been dried and pounded, to an amphora, you will make wines seem old, and you will make them durable. You will also make wines seem old if you take two jars, that have been filled with old wine, and break off their handles and edges, and the extremities of their bottoms (which do not partake of the savour of the

[a] Matth. iii. 146.

[b] The Attic κυαθος $= \frac{1}{12} + 0.356$ solid inches of an English pint, wine measure.

the wine), and throw them away; and having pounded and sifted the other part, if necessary, with the old lees of the wine, throw in half a modius[c] into an amphora, and stir the wine, and having stopped[d] it, let it remain fifteen days, then open and use it, and you will think the wine ten years old: and when the wine is consumed, pour the lees into a fresh pot, and having stopped, and burnt and sifted them, use them again in the same manner; for the use of these will be sufficient, instead of all the fore-mentioned aromatic ingredients. But some make wines seem old in this manner: having pounded and tied one ounce of melilot, three ounces of glychirriza[e], the same quantity of celtic nard, two ounces of hepatic aloes, they throw them into the wine, and they then use it.

XXV.—THAT WINE MAY HAVE NO YEAST.

Besprinkle dried œnanthe over the wine, or mix flour of orobus with the wine; and when the flower

[c] The Roman modius was a measure for things, = one peck + 7.68 solid inches, in English corn measure.

[d] Having smeared it all round, in the Greek.

[e] Liquorice, or the sweet root.

flower[f] and the meal have subsided, pour the wine into another vessel.

XXVI.—TO AMEND THE WATERY TASTE OF WINE.

You are to pour in four cotylæ of garum[g] and the leaves of the pomegranate, and they will remedy the watery taste. And you will cure the unpleasant savour thus: you are to put into the cask rich lighted torches; but some having stopped a vessel containing water, lay it in the cask, and after the third day the wine will be fine, but the water will have a bad smell. Some likewise put in burnt shells: some let down hot barley bread in a basket; others throw in the seed and leaves of parsley; others mix the whey of new-made cheese with it; others apply the[h] willow-tree, and remove every thing that is faulty in the wine.

f *i. e.* the œnanthe.

g It was made from the fish called by the Greeks γαρος, its entrails being macerated and dissolved in salt. It was afterwards made from the fish called *scomber*. Pliny, lib. xxxi. cap. 7.

h The Greek says, the wood of the willow.

XXVII.—TO CURE WINE HURT BY ANY NOXIOUS ANIMAL.

HOT bread, or an iron ring thrown in, takes away the poison.

XXVIII.—TO STOP THE FERMENTATION OF WINES THAT ARE FECULENT AND TURBID.

SOME pour a cotyla of amurca, boiled to a third part of its quantity, into every *metretes*[i], and the fermentation is speedily stopped.

XXIX.—TO MAKE WINE APPEAR TURBID.

HAVING expressed the juice of radishes, pour it into the wine.

XXX.—THAT A PERSON DRINKING WINE MAY NOT SMELL OF IT.

CHEW some Iris[k] Troglodites.

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[i] The Attic μετρητης, = 10 gallons 2 pints, 19.626 sol. inch.

[k] Supposed to be the African Iris, which Pliny says was very large, and of the most bitter taste, lib. xxi.

XXXI.—THAT A PERSON DRINKING MUCH WINE MAY NOT BE INEBRIATED.

HAVING roasted the lights of a goat, eat them, or, when fasting, eat five or seven bitter almonds, or eat raw cabbage, and you will not be inebriated. A person that drinks likewise will not be in liquor, if he is crowned with *chamæpitys*[l]; or if, in drinking the first cup, he repeats this verse of Homer:

[m] "Thrice thunder'd Jupiter from Ida's heights."

XXXII.—HOW ANY ONE WILL ABSTAIN FROM HAVING TOO GREAT A DESIRE FOR WINE.

COLLECT the moisture that runs from the shoots after they are cut, and give it the person in liquor in his cups, unknown to him, and he will abstain from having too great a desire for wine.

XXXIII.—TO MAKE PERSONS IN LIQUOR SOBER.

VINEGAR copiously drunk, and radishes eaten, and pastry[n] made with honey, and sweet[o] cakes, make

[l] Sometimes called *Aiuga*. Matth. iii. 157.

[m] Ilias, Θ, v. 170.

[n] Plutarch says the same thing, Symp. iii. 7.

[o] These were called by the Romans *placentæ*.

make persons in liquor sober; and so do disquisitions and relations on the subject of old stories, and chaplets[p] of various flowers set on the person's head.

XXXIV.—NOT ONLY WINE, BUT OTHER THINGS, MAKE THE PERSONS THAT DRINK THEM INEBRIATED.

WINE indeed is the first of the things that are drunk which makes persons inebriated; secondly, water, although it may seem a paradox; thirdly, drink[q] made from wheat and barley, which the barbarians mostly use; fourthly, drink made from rye and oats; and what is made from millet and panic intoxicates. Old men, and all that are of a cold habit, are easily intoxicated; but women are less liable to intoxication than men on account of their constitution, yet they get in liquor by the act of drinking.

[p] Galen says the same thing, lib. ii. c. 2.

[q] Called *cremor hordeaceus* and *cerevisia*, and by the Greeks οινος κριθινος, used in Gaul, Spain, and Britain, and in Egypt; Pliny, lib. xiv. sect. ult. Herodotus says, that the Egyptians used wine made from barley, l. ii. Dioscorides calls this liquor κουρμι, lib. ii. c. 110.

XXXV.—HOW WINE IS MADE WITHOUT GRAPES.

The fresh fruit of the myrtle and of the cherry ground and pressed makes wine. Pomegranates likewise cleanly pressed, the pips in the middle being taken away, make wine. Some also make wine from green figs in this manner: they lay figs in a wine-jar till it is half full; they then fill the vessel with clean water, and they often taste it; and when the flavour is vinous, they lay it up for use.

XXXVI.—AN INFALLIBLE PREPARATION OF WINE THAT PRESERVES HEALTH TO OLD-AGE.

Four drams of the best iris, a tryblium[r] of fennel-seed, the same quantity of flour, one dram of pepper, two drams of myrrh *troglodites*[s], one dram of *seseli*[t], half a dram of *meon*[u]; having pounded

[r] Τρύβλιον was a vessel made in the form of a dish. It is possible it contained some inferior quantity three times.

[s] What was called by this name by Dioscorides is now supposed to be the *benjovinum*. Diosc. lib. i. 77.

[t] The Greek, Latin, and Italian name of this plant is the same; Matth. iii. 53.

[u] It now goes under the name of *meu*; Matth. i. 3.

pounded these, pour over them a sufficient quantity of well-flavoured white wine, and mix them; and having reduced them into a mass, tie them in a thick cloth, and lay them in a vessel, and pour some very good wine over them; and having stopped it, after four days open it, and drink a cup fasting. If a person uses this always, he remains in good health. But it is better if they are put into must.

XXXVII.—CONCERNING PERCOLATING WINES.

LAY the strainer[v] in sheer brine, or in sea-water mixed with river-water, during two days, and afterward wash it thoroughly with wine; and indeed, when you want it, press it; then rub the edges of the strainer with almonds, or with pounded nuts[w]. But some mix with the wines that are percolated anise, or they apply to them a lighted torch, or gypsum, or sapa, or honey, or the lees of good wine, or the meal of orobus.

[v] The part through which the liquor was percolated, probably.

[w] Καρυοις, walnuts.

BOOK VIII.

HYPOTHESIS.

These things are in this Book, being indeed the Eighth of the select Precepts of Agriculture, and containing the different preparations of wines and of other liquors[x], and the inferior preparations of all kinds of vinegar.

I.—PREPARATION OF SALUTARY WINES.

THE means of preserving and preparing salutary wines that cure different diseases, which many of the ancients recommend from experience. The preparation of them has nothing of the nauseous property of physic, but it is very simple, as from roses, or from anethum, or from absinthium, or from pulegium, and from things of this kind. But it is necessary to pound each of the fore-mentioned sorts, and to tie them in a cloth, and to put them into the wine, in the way hereafter recommended.

II.

[x] Και ετερων προπωματων. Προπωματα were liquors which were drunk before meals.

II.—RHODITES.

HAVING tied together a due proportion of dry mountain roses, and anisum, crocus, and honey, put them into wine. This wine is good for complaints in the stomach, and in pleuritic cases.

III.—ANETHITES.

THE seed of anethum is to be put into a cloth, and then to remain in wine; and this wine is soporific, it is diuretic, and it promotes digestion.

IV.—ANISITES.

THE seed[y] of anisum put into the wine stops the difficulty of making water, and it is of utility to the bowels.

V.—APITES.

WINE having pears put into it astringes[z] the belly.

 VI.

[y] The seed is here, and in many other parts of this collection, called καρπος.

[z] Κοιλιαν ιστησι; literally, "causes the belly to rest." Κοιλια here signifies the belly, relative to the intestinal discharge, as

VI.—ASARITES.

This wine is diuretic; it strengthens persons that are dropsical, that have the jaundice, diseases of the liver, the sciatica, and that have a tertian ague;

Hippocrates uses it. *Alvus* is used by Celsus, in the same sense. The word ιστησιν in this place assumes a meaning which the second and fourth, and other conjugations in Arabic express. The Hebrew grammarians give them the appellations of *hiphil* and *hophal*. Although the Greeks and Romans had no regular modification to convey this causal sense, it is very often understood in their verbs. The verbs γινομαι and γεινω have this sense and a change of form. The Latin words *cieo*, *excito*; *cado*, *cædo*; *sto*, *statuo*, with many others, convey this meaning. The word *ruit* has it in the following passage:

Quid dicam, jacto qui semine cominus arva
Insequitur, cumulosque ruit male pinguis arenæ?

Virg. Georg. i. 105.

The Spanish language, which has reserved much of the construction and spirit of the Latin, and which has received a supply of many Arabic words, often makes use of this oriental mode of expression in its verbs; as, *abonar*, *acariciar*, *querellar*, *apresurarse*, *obligar*, *enojar*, *calentar*, *limpiar*, *chular*, and in many and many more. Other examples of this kind might be adduced from the living languages of Europe; and the English verbs afford some instances of this eastern mode of expression. *To lay*, *to cause to lie*; *to fell*, *to cause to fall*; *to raise*, *to rise*; *to set*, *to sit*; *to suckle*, *to suck*. *To learn*, and other verbs, use it without change of form.

ague; and it cures diseases, the indication of which is a rigor[a].

VII.—GLECHONITES.

It is proper to boil the pulegium in wine till a third part is left. This wine is salutary against the poison of serpents[b], and it is useful against the winter's cold.

VIII.—DAPHNITES.

This wine is very warm; it is diuretic, it is useful in coughs, in diseases of the thorax, in pains[c] in the intestines: and it is of service to persons in years, and it is proper against the poison of serpents, and against the ear-ache; and it is of use to women in the hysterics.

IX.—MARATHRITES.[d]

This wine promotes an appetite, strengthens the stomach, and it is diuretic.

X.

[a] *i. e.* chilliness.

[b] Venemous animals of the creeping class, in conformity to the etymology of the word in the Greek and Roman languages.

[c] Στροφος.

[d] Fennel wine.

X.—CONYZITES.

This wine is proper for persons in the jaundice, and in complaints of the stomach; and it is of use against the bite of serpents.

XI.—OMPHACITES.

This wine is good for the stomach; it is proper for persons that are paralytic, that have a torpor[e], that are tremulous[f], that have a vertigo[g], that have diseases of the kidneys, and that have the colic, and for pestilential diseases.

XII.—PETROSELINITES.

This wine strengthens the stomach, causing eructation, and exciting an appetite; it is diuretic, and very soporific.

XIII.

[e] A numbness, or deficient feeling and motion.

[f] Tremors, in some cases, in the modern practice of physic, require the same treatment as palsies.

[g] Called *scotomatia*, when the eyes are darkened, or so affected, as if several colours were before them.

XIII.—PEGANITES.

This wine is warm and an alexipharmic[h] for deleterious medicaments, and for poisonous reptiles.

XIV.—TELITES.

This wine (the fenugreek being pounded and put into the wine) is particularly adapted to complaints of the liver.

XV.—HYSSOPITES.

This wine purges the thorax[i]; being warm, it promotes digestion, and it mollifies the abdominal viscera.

XVI.—SELENITES.

Throw the pounded seed of parsley into the wine, and it becomes diuretic, and excites an appetite; and it is of service in nervous and hypochondriacal diseases.

XVII.

[h] What repels poison by forcing it through the pores.

[i] The breast, which is divided into anterior, posterior, and lateral.

XVII.—WINE FROM APPLES.

Lay some very well-flavoured quinces in jars, and pour wine on them; then having stopped them, let them remain during three days, and on the fourth day use them.

XVIII.—PREPARATION OF CATHARTIC WINE.

When the trenches are dug, pound the roots of black hellebore, and having cleared the roots of the vine, throw the pounded hellebore over them, and then adjust them.

XIX.—WINE CALCULATED TO IMPROVE A WOMAN'S MILK, AND KEEPING HER FROM FALLING INTO ANY ILLNESS.

Gather some thyme while it is in blossom; and having dried it, pound it; then throw four chœnices into a jar, pouring over it a proportionate[1] quantity of white wine, and stop the jar during forty days.

XX.

[1] A measure, in the Greek.

XX.—WINE FOR THE DYSENTERY AND FLUX OF THE BELLY.

Take thirty pomegranates before they are ripe, and bruise them; then lay them in a jar, and pour three *chooi*[l] of rough black wine over them, and use them after thirty days.

XXI.—CONCERNING ABSINTHITES.

Pound eight drams of absinthium, and particularly of the Pontic[m], and having tied it in a cloth, that is not of too dense a texture, lay it in a jar[n]. Some indeed lay in half of the absinthium, and many mix cassia with it. When therefore you lay the cloth in the jar, pour in the must till you fill it, affording it one vent-hole, that it may not ferment to too great a degree. Prepare as many jars as you wish in the same manner; and use the absinthites for diseases of the hypochondria

[l] The Attic χους was 6 pints 25.698 sol. inches. It differed but little from the Roman *congius*.

[m] This absinthium is mentioned by Cato, clix. and by Vegetius, iii. 28, 7.

[n] In an amphora, in the Greek.

chondria and of the liver, and for crudities[o], and for pains in the stomach. It also throws out noxious animals bred in the intestines.

XXII.—THE MAKING OF AMINEAN WINE.

Some indeed pouring wines of Aminean flavour into a vessel which had Italian wine, bury it in a place under the open air; and some throw in a few bitter almonds, and a little of the Indian leaf, and a little defrutum: and others put into seven amphoræ two drams of hepatic aloes and of cyperus[p], or of other aloes, three drams of amomum[q], four drams of costus, four drams of the Indian leaf, nine drams of melilot, two drams of Indian nard, three drams of cinnamon wood. Some also add four drams of each of these, of myrrh, cassia, crocus. Some use the sweet-scented calamus instead of myrrh.

XXIII.

[o] Indigested substances in the stomach.

[p] The French call it *souchet*, the English *galangale.*

[q] Αμωμον; in Italian *amomo.* Many plants have this name. Galen says of the true *amomum: Amomum acoro similem facultatem obtinet, nisi quod acorum siccius sit, majore autem concoquendi facultate amomum*; lib. vi. Matthioli, p. 53.

XXIII.—PREPARATION OF THASIAN[1] WINE.

We insolate the grapes when ripe, laying the bunches in pairs during five days, and on the sixth day at noon we take them up warm, and immerse them in must and sea-water boiled to half its quantity; and we take them up and lay them in the press; then having trodden them the following night and day, we pour the liquor into vessels; and when it has fermented and is fined, we pour a twenty-fifth part of sapa into it; and after the vernal equinox we rack it into proportionate vessels.

XXIV.—PREPARATION OF COAN WINE.

Some indeed boil three parts of must and one of sea-water into a third of the quantity; but others mix with two measures of white wine one cotyla of salt, three cotylæ of sapa, one cotyla of must, one cotyla of flour of orobus, one hundred drams of melilot, sixteen drams of Celtic nard.

XXV.

[1] Pliny mentions this wine, lib. xiv. 7.

XXV.—CONCERNING ŒNOMELI.

Put some Attic honey into an earthen pot, and set it on hot ashes, that[s] it may be clarified; and after the honey has been warmed, pour four sextarii of wine to a sextarius of honey, and then pour the œnomeli into vessels that are well pitched; and having pounded twelve scruples of dry costus, and having tied it in a cloth, suspend it in the œnomeli; and having stopped, set it in a room up-stairs. But some having pounded twelve scruples of the Indian leaf, mix it with the œnomeli, and they find it good beyond expectation after fifteen days; and when it is old, it is incomparable. Others indeed make œnomeli thus: they mix six scruples of myrrh, twelve scruples of cassia, two scruples of costus, four scruples of nard, four scruples of pepper, with twenty-four sextarii of Attic honey; and they set it in the sun at the rising of the dog-star during forty days. Some call this nectar.

XXVI.—ŒNOMELI FROM MUST.

Let the must stand until it has subsided to a certain degree, and mix one sextarius of Attic honey

[s] "That froth may arise," in the Greek.

honey with ten sextarii of must; and having poured it into the jar, and having secured it with gypsum, set it in the shade. But it is proper to know that the œnomeli from must is flatulent and improper for the stomach, but it is good for the bowels.

XXVII.—PREPARATION OF HYDROMEL.

Having cut thirty-two of the best apples small with a reed, and having taken out the pips, put them into eight sextarii of the best honey; and having suffered them to remain eight months, mix with them twelve sextarii of rain water, that has been kept a considerable time, and insolate them under the heat of the Dog-star, keeping out the rain and dew. Others, acting more judiciously, prepare hydromel thus: having pounded the best apples that are come to maturity, and having expressed four sextarii of the juice, and having mixed eight sextarii of the best honey, that has been skimmed, and twelve sextarii of rain water, and having insolated and sufficiently boiled[1] it, they use it. But some boil it

[1] When the ingredients are united, I use the singular number.

it in a double[u] pot, so that it may seethe more from the heat of the water, and not immediately from the fire, as it is the custom in Spain.[v]

XXVIII.—ANOTHER PREPARATION OF HYDROMEL.

TAKE some stale[w] rain water, or what has been boiled away to a third part, mix with it a sufficient quantity of honey, and having poured it into a vessel, set it in the shade during ten days, leaving a hole for vent, and so use it; but if it were old, it would be better. Empirics also use this in diseases,[x] knowing that it is compounded of water and honey only. Others indeed mix snow only with honey; and having well wrought it,

[u] Διπλῳ λεβητι, *i. e.* in a small pot, placed in one that was more capacious, with water in it. This process is in modern times called *balneum mariæ*.

[v] The different readings in this place have subjected the passage to some ambiguity.

[w] *Cum aqua pluvia cessat putrescere, tum dulcedinem acquirit.* Plin. xiv, 17.

[x] Εν ταις ασθενιαις, in infirmities. *Hydromeli quoque ex imbre puro cum melle temperebatur quondam, quod daretur appetentibus vini ægris, veluti innocentiore potu.* Plin. xxxi. 6.

it, they lay it by, and it is a medecine used in raging fevers[y]; and they call it *chionomeli.*[z]

XXIX.—RHODOMELITES.

Having pounded some good roses (mountain roses, if they are to be procured) judiciously[a] gathered, and having squeezed them in the press, and having poured two sextarii of the juice, mix a sextarius of honey with it. Having skimmed the honey, pour it into the juice of the roses, and having poured it into a vessel, mix[b] it well, and set it in a place that is dry.

XXX.—PREPARATION OF PARSLEY WINE.

Twelve scruples of parsley seed (some put in sixteen scruples), six scruples of the seed or of the green leaves of rue, one sextarius of skimmed honey, five sextarii of wine; having mixed all these, set them by during fifteen days.

 XXXI.

y Burning.

z So called, because mixed with snow.

a Εξωνυχισμενα, taken with those parts of the petals that were fixed in the empalement.

b Ανατaραξον ευτονως. The Greek expression implies the mixture was effected by briskly moving the composition upward.

XXXI.—PREPARATION OF CONDITUM.[c]

Let eight scruples of pepper washed and dried, and carefully pounded, one sextarius of Attic honey, and four or five sextarii of old white wine, be mixed.

XXXII.—PREPARATION OF THE BEST SAPA.[d]

If you boil and skim eight sextarii of the best must, and a hundred sextarii of the best wine, to a third part, you will make it excellent.

XXXIII.—PREPARATION OF DIFFERENT SORTS OF VINEGAR, AND HOW ONE MAY MAKE WINE INTO VINEGAR.

Take and pound beet-root and lay it in the wine, and it will be vinegar in three hours. But if you wish to make[e] it change a second time, put some cabbage-root into it.

XXXIV.

[c] Wine impregnated with aromatics and honey.

[d] The εψημα of the Greeks.

[e] *Αποκαταςησαι* signifies to bring the composition from its last state; it does not imply into its first state, as the Latin word *restituere* in the translation does. The Latin and English languages have not correspondent terms to express the idea.

XXXIV.—VINEGAR MADE WITHOUT WINE.

PUT some tender peaches in a jar, and having parched some barley, sprinkle it over them, and suffer it to putrify; then percolate and use it. You are also to make vinegar without wine thus: lay some tender figs in a jar, and parched barley, and the insides of citrons, and stir them often; and when they are properly compounded, percolate and use it. You will make vinegar without wine thus: boil gypsum and sea-water; having then mixed it with river-water, when it has been percolated, use it.

XXXV.—VINEGAR CALCULATED FOR DIGESTION AND HEALTH.

PUT eight drams of squill and one sextarius of vinegar in a vessel, and a due quantity of pepper, and of mint, and of cassia, and of ripe berries of the juniper, and after some time use it.

XXXVI.—PREPARATION OF SWEET VINEGAR.

TAKE a jar of very sharp vinegar, and having mixed with it an equal quantity of good must,

that has been trodden,[f] stop it with pitch, and having suffered it to lie thirty days, use it. But some make sweet vinegar thus: they boil one measure of must as it runs from the treading, with two measures of vinegar, until the third part be boiled away. Others boil two measures of must and a measure of vinegar, with three measures of river-water, previously boiled, until the third part of the whole be boiled away, and two thirds remain.

XXXVII.—PREPARATION OF SHARP VINEGAR.

Dry the grape kernels during two days, and lay them in must with a few sour grapes, and after the seventh day use it; or throw in pyrethrum[g], and it will be sour. You will also make it sour if you take a fourth or fifth part of the vinegar, and heat it over the fire, and add it to the remainder, and set it in the sun during eight days. The stale roots of agrostis thrown in, and dried grapes, and the pounded leaves of the wild pear,

[f] This was sweeter than what came from the press, because the bruised grape-stones did not contribute to give it sharpness.

[g] Pellitory of Spain. The Greek name seems to allude to the fiery quality of the root of the plant.

pear, and bramble roots, and milk whey, will make vinegar very[h] sharp and pleasant. The hot cinders also of burnt oak, and a decoction of erebinthai,[i] and burning hot shells, thrown in, make vinegar sharp.

XXXVIII.—THAT VINEGAR MAY KEEP SOUR.

HAVING mixed beans with an acid citron, throw them into the vessel.

XXXIX.—TO MAKE PEPPER VINEGAR.

PUT some whole pepper in a cloth, and having suspended it in the vinegar eight days, use it.

XL.—PROOF OF VINEGAR, WHETHER IT IS MIXED WITH WATER.

THROW some nitre into the vinegar; and if it swells, as if boiling, conclude that it is diluted.

XLI.—HOW TO MAKE A DOUBLE QUANTITY OF VINEGAR.

TAKE a certain measure of vinegar, as for example, an Attic measure; add to it one Attic

 measure

[h] Δριμυτατον.

[i] Vetches.

measure of sea-water boiled to half its original quantity, and having mixed them, lay them by in a vessel. Some indeed having macerated and percolated barley, mix one Attic measure of the liquor with one Attic measure of vinegar, and they stir them together; and having thrown in a sufficient quantity of parched salt quite hot, they stop the vessel, and they suffer it to remain twenty days. Some also throw figs moistened and putrified on the trees into water, and permitting them to putrify together, they make vinegar.

XLII.—TO MAKE SQUILL[k] VINEGAR.

POUR into a jar thirty-six[l] sextarii of the best and sharpest vinegar, and take the inside of the[m] white

[k] This has the credit of having been made by Pythagoras; and when he began to make use of it, he was fifty years old, and his life was prolonged to a hundred and seventeen years; and he is said never to have been assailed by ill health.—Galen. op. l. iii. c. 249.

[l] I have used this term in preference to the Greek ξεσται, because it is more known. The *sextarius* was more capacious than the ξεστης 1.353 sol. inch. It was the sixth part of the Roman *congius*, as the ξεστης was the sixth part of the Attic χους.

[m] The Greek says, of the peel of the white squill.

white squill cut into small pieces, and dried in the sun during thirty days; macerate it in the vinegar during twelve days; then take the vinegar and set it by, and use it when you wish; for squill vinegar will be no less useful than the squill wine.

BOOK

BOOK IX.

HYPOTHESIS.

These things are contained in this Book, being the Ninth indeed concerning the select Precepts of Agriculture, and comprising every method concerning the planting and care of the olives, and the making of oil from immature olives; and every other care and management in relation to the oil; and concerning the various modes of preserving olives.

I.—CONCERNING OLIVES.

THEY say that the olive was thus produced: all the earth being in the beginning covered with water, and when it first appeared at Athens, Minerva and Neptune being enamoured with the situation, contended to build a city with their name. But Jupiter, wishing to put an end to the contest between them, says, "Whoever bestows the most useful gift on the city, let him have it." Neptune therefore supplied it with ports and naval[m] repositories; and Minerva raised an olive in the citadel, flourishing and fruitful; and being crowned with it, and by all admired, she obtained

the

[m] Νεωρίοις, with docks.

the victory, and they called the city Athens, after her name. Neptune thus being overcome, betook himself into his usual limits: from which circumstance the arbitrators set a chaplet of the wild olive on the heads of those who overcome in difficult contests. The inscribing of the word *Athena* on the leaf of the olive, and fixing the leaf on the head with a thread, has indeed been useful, and it has, as a charm, cured the head-ache.

II.—CONCERNING THE PLANTING AND THE CARE OF OLIVES, AND THAT A DUE ATTENTION TO THESE IS OF THE GREATEST ADVANTAGE.

THE return arising from the olive-tree being very necessary (for no other produce can be thus preserved during a length of time), it is requisite that they who are employed in agriculture should bestow the greatest attention on the olive: for the produce from the olive has not only infalliable and certain returns; but the fruit of the olive is also of the greatest utility to all the ails of life. The leaves of olives being turned, also announce the summer solstice, as does the lime, and the elm, and the white poplar. Judge also that the olive is fruitful, if it does not produce fruit at the sides, but at the top of the shoot. But

the

the olive being pure, ought to have them that gather it chaste; and they ought to swear that they come from their own wife's, not from another's bed; for it will thus produce a great abundance of fruit for the time to come. They say also, that in Anazarbe[a] of Cilicia, chaste boys cultivate the olive, and for this reason, that the olive is there very fruitful.

III.—CONCERNING AIR SUITABLE TO OLIVES, AND THE FORM OF THE GROUND.

A WARM and dry air is adapted to olives; and one may see this in Libya and Cilicia, and their olives. But the form of the ground, when inclined and high, contributes to the suitableness of the air; for this, in situations of this kind, because the burning heat of the sun coming from above is cooled by the winds, makes the best oil, and that which is prepared and called the crude[b] wrought oil; but the olives in champagne situations being indeed less moved by the winds, and more powerfully warmed by the sun lying on them,

[a] A town of Cilicia, which gave birth to Dioscorides.

[b] Ωμοτριϐις. It was made of olives before they were ripe. Το ωμοτριϐις ὁ και ομφακινον καλειται. Galen. lib. 3.

them, produce the thick oil. On the whole then it is to be observed, that the winds give animation, not only to plants but to all things, as vehement and impetuous winds are unpropitious to all things; but they mostly contribute indeed to the thriving of all plants, and particularly to that of the olive. You will therefore find those plants of the olives peculiarly flourishing, to which the free air has access, the distances between the plants being considerable, through which the wind can find its way in due proportion. For this reason then we have said, that inclined and high situations are eminently adapted to the olive, because they always receive a temperate wind, which injures nothing, but approaches each tree impartially, and it cherishes and promotes the growth of the plant.

IV.—CONCERNING THE TIME OF PLANTING OLIVES, AND IN WHAT KIND OF GROUND YOU ARE TO PLANT THEM.

You are to plant olives from the setting of the Hyades to the winter solstice, that is, from the fifteenth of the month of November, to the twentieth of the month of December. You are likewise to plant the olive in the spring; for the two

seasons

seasons resemble each other in respect of moisture and cold; for the autumn indeed keeps the ground warm from the heat of the sun, and it preserves its moisture from the autumnal showers; and the spring indeed possesses moisture from the preceding showers, and it assumes heat from the approach of the sun. The moist soil produces more flourishing and more rich olive-trees; for which reason you are to prefer this soil: and the next to this, is the white potters clay; the third is the hard potters clay. But we do not recommend the deep soil, nor the red, for being hot it kills the plants with heat; and you are more particularly to avoid the soil that is dug deep, for it produces poor and watery fruit; but light land is suitable, and Attica bears testimony to this.

V.—CONCERNING A NURSERY.

INDEED the setting of the plants already mentioned in their own ground is a more compendious way, without the delay arising from the taking of the plants up from the nurseries. But as plants removed from the nurseries possess more infallible principles of vegetation, we will shew the mode of making nurseries. It is neces-

sary

sary then, as we have[q] often already mentioned, that the nursery should be always equal to the soil to be planted, not only in quality and form, but in the quality of the air also, that the plant that is to be set in it may not suffer from its novelty. You are then to take into the nurseries shoots from the young and fruitful olives of a proper thickness, not such as have sprung from the trunk, but above, from the shoots for cutting and the young branches. Let the measure also be a cubit, and let not the bark be lacerated in the cutting; for it is proper to observe this most correctly. You are also to trim the wound on every side with a sharp knife, keeping the plant[r] close cut and whole; but let the lower end be smeared with cow-dung mixed with ashes; and we are to set it in the ground, so that it may protrude four fingers breadth, and we are then to excavate the trench, as it has been already[s] mentioned, for the reception of the showers. It is also proper, as we have said, previously to observe, that the cutting may not be set with its head downward; and we are to fix a reed that

the

[q] II. 48.

[r] Ακεραιον και ολοκληρον. The first word means, that the shoot ought not to have any superfluous part of the wood or bark of the wood from which it was taken.

[s] See x. 2.

the workmen may know the plant[t]; and it is necessary to stir the plants in the nurseries every month, for seven months. In the space of three years, this training in the nursery may be of utility; but the fourth year you are to take off the superfluous branches, and thus you are to remove the plants into the ground that is to be set, carrying with the plants a portion of their own native soil. The mode indeed of planting olives also by means of cuttings is useful. But some, setting in the nurseries large[u] shoots taken from the lowest roots, which by the Syrians are called *gorphia*[v], when they see them fit for removing, transplant them. But many setting them, not in nurseries, but in their own soil[w], have not missed their aim. But it is better to set such things mostly in nurseries; for, when diligently watered in them, they quickly shoot, and they are easily transplanted.

VI.

[t] The sight of the plant, in the Greek.

[u] Ξυλα.

[v] From the eastern word גרפ, in the infinitive, *to pluck*; or from the Arabic word جبرف, which signifies to take away wholly, or, as it is expressed in English, root and branch.

[w] Have not thoroughly erred, is the Greek expression.

VI.—CONCERNING TRENCHES FOR THE PLANTING OF THE OLIVES.

When the planting of the olive takes place, it is proper to clear the places in which it is to be made, and to take away every thing of heterogeneous quality, and to throw up a wall or a hedge. But it is proper, and peculiarly so, to dig the trenches the year before planting, that the soil may be rendered more friable by the sun, and by the breezes and the showers, and that the plants may throw out roots. But if we are in a hurry to plant, we are to burn at the bottoms of the trenches two months before, or at least one, dead shoots and reeds, and such things as are easily burnt, during many days together. The trench indeed ought to be three cubits deep, or not less than two and a half. Let the trenches also be fifty cubits distant from each other, that the stems of the trees may be well aired, and that the intermediate space may be sown. But some thinking the mode of sowing beneath them, make the plantation thick, but so that the plants may not be shaded one by another.

VII.—OF WHAT SORT THE OLIVE PLANTS TO BE SET OUGHT TO BE.

The olive plants ought to come from suitable situations, and from young trees that bear yearly; having stems of due thickness, or more than commonly thick; and they ought to be smooth and straight.

VIII.—TO MAKE AN OLIVE-TREE FERTILE.

Bore the stem quite through with an auger, and taking two shoots from another fruitful olive, set in the extremities of the shoots from each side, so that they may come through at the opposite side; and taking hold of both shoots, draw them through with your hands; and when they are drawn in close as a wedge, cut the superfluous parts off from each side, that is, the parts of the shoots that protrude and smear the perforated places on each side with clay and chaff, and the tree will produce plenty of good fruit.

IX.—CONCERNING THE CARE OF THE FULL-GROWN OLIVES.

Concerning the planting and culture truly then of the olive-trees, we have laid down sufficient

ficient instruction: and now follows information relating to the care of the full-grown olive-trees. Perform therefore the work, that is, the ablaqueation, at that period, which is also prescribed in relation to the young[x] plants. But it is proper that the digging to a considerable depth, and the laying on, and the quantity of the compost, and the depth of the mould, be in proportion to the stems, and to their size, and to the nature of the ground. It is indeed right to carry less compost to places where the plants shoot at a more early period, and to wet situations, and in an interval of many years; and to use the accumulation of mould more sparingly, lest the trees impelled to shoot hurt the fruit in its earliest[y] infancy. But in situations that are more steril and more dry, it is proper to bestow more compost, and speedily; and to raise[z] the accumulation of mould higher to the stems, that they may shoot more successfully by means of the compost; and that they may not be scorched by the sun by means of the accumulation. But bestow on the full-grown olives, already mentioned, a thorough pruning, as well as on

[x] 3, 13, and 5, 20.

[y] In its blossom, in the Greek.

[z] To use, in the original.

on other trees, in the autumn, after the setting[a] of the Pleiades; for at that season the trees seem to be more firm and more strong; for it happens to them first, that the moisture has been drawn up for the support of the shoots, and for the nourishment of the fruit: and secondly, because the moisture left after the summer's heat, is dried up: and thirdly, because they have not yet received the winter's showers; so that, for all the reasons already enumerated, the season of the autumn is the most adapted to prune trees, which are then very strong, and especially the olive. But it is necessary that he who is going to prune, should first manure, that the utility of the compost may be opposed to the injury from the pruning; for the trunks that are thoroughly pruned suffer during the time, on account of the wounds; but when manured they soon recover, and they shoot more speedily. But it is requisite to prune the dry wood, and what grows from the middle of the tree, that[b] it may have free air: and it is proper to take away the branches that lie one on another, and to study the thinning of them; and indeed to cut off the crooked branches, and especially such as are too long, and those that

[a] About the sixth of the ides of November.

[b] "That it may have respiration," is the Greek phrase.

that grow into immoderate length, being naturally steril. For it has for this reason been reckoned among all farmers that olive-trees ought not to be more than ten cubits long, and that a length beyond this is hurtful, the branches being broken by the vehemence of the winds, and the blossoms disturbed, and falling off before the time. Wherefore many draw the branches of the plants down to the ground, making the tree become lower and more depressed. We have now said enough concerning the pruning of the full-grown olives, which it is proper to perform for three or four years. You are likewise to remove every year the branches that grow on the trunks[c], while they are yet tender, that the trunk may not suffer inconvenience from them.

X.—HOW ONE MAY MAKE OLIVE-TREES FLOURISH AND PRODUCE PLENTY OF FRUIT; AND HOW ONE MAY CURE THEM, WHEN THEY ARE DECAYING.

You will render the olive-trees more thriving, and more flourishing, and exceedingly fruitful, if, after digging round the roots, you pour over each root two cotylæ of amurca, from olives that

 have

[c] The Greek word means the lower parts of the trunks.

have not been salted, equally mixed with river water; or a basket or two of bean straw, in proportion suitable to the tree; or potters earth mixed with cow-dung, or so much sea-weed. Stale urine also poured down the trunk is not less useful. But it is necessary after this immediately to heap on mould, laying it around from the roots to the height of two palms; and to make an excavation round the accumulated mould for the reception of rain-water. It is indeed proper to apply this remedy during the heat of the Dog-star. It is also of greater utility to use rigation at that period, and especially if there is a drought. But you are to make trees that are steril bear fruit plentifully in this manner: making[d] an opening, about the measure of a cubit, from the lower end of the trunk, and perforating the trunk down to the south side with an auger, forming a hole of the size of one's middle finger, and boring the trunk quite through; then taking two olive shoots from another tree, that has always been fruitful, fill the holes on each side, so that both the shoots may come quite through; and taking hold of them, draw them forcibly; and when

[d] Αποσχων. This term was applied in physic to scarifying and opening a vein.

when the hole is, as it were, wedged[c] on both sides, the shoots having been equally drawn, cut off the superflous parts on each side, and cover the holes with clay[f] and straw: and as you would wish the olives to prove, you should set in such shoots as it has been prescribed; for thus the olive-tree will produce better oil, the shoots of a plant that used to bear good oil-fruit having been set in. But it is necessary to take the shoots from the southern side of the tree. You will also remedy the olive-trees that are too luxuriant, that is, that produce a multiplicity of leaves, but little fruit, in this manner: fix a piece of the wild olive, or of the pine, or of the oak, or a stone, in the roots. You will also thus remedy those that indeed bear much fruit, but do not afterward ripen it, as well as those that inauspiciously shed their flowers: having dug round the trunk, throw over one of superior size, indeed two baskets of sea-weed, and over one of inferior size a less quantity; having then mixed amurca with river-water, pour four congii[g] down each trunk; and if there is no sea-weed, use the

[c] *i. e.* well closed, as a fissure with a wedge.

[f] The expression in Greek implies that they were mixed.

[g] Τετραχουν, a measure of four χους.

amurca alone. But in relation to the remedy against noxious animals, and the injury from the circumambient air, we have given instruction in general terms, in the discourse[h] relating to vines. It is then necessary, if you find the roots dry and morbid, to know that worms bred at the bottom are the cause, which you are indeed to destroy by many methods, as it has been already mentioned, but particularly by the planting[i] of squills.

XI.—THAT THE PLANTATION OF THE OLIVE IS EFFECTED IN MANY AND DIFFERENT WAYS.

It is proper also to know that what is planted is sometimes indeed buried in the ground, and sometimes a part of it committed to the soil, and a part lies above it. Those things then that are totally covered want no kind of mark when they are selected; but it is proper to plant those that in part lie out of the ground, as they primarily had the stem to the east, or to the south, or to the west, that they may not suffer from the novelty of the air. You are also to water the plants twice or[k] thrice, if possible, when there are no showers; and

[h] 5, 48, &c.

[i] 2, 10, 90, &c.

[k] And, in the Greek.

and you are to set in the trenches on each side of the plant two sticks, even and straight, or reeds, or dead shoots tied together, so that they may lie above the trenches; and when the plant is trodden down, you[l] are indeed to finish the covering of it; and you are to fill up the vacant places with small stones or shells; and you are to cover them with a larger stone, that the rain-water may have access to the roots. But it is necessary to take the plants immediately to set in moist weather. But the planting of the olive is effected various ways. For some indeed plant it from cuttings; for they take the thicker branches and saw them to the length of a cubit, and so plant them. Some likewise plant them thus from truncheons: having sawn off the thicker branches to the length of two cubits, they set at the bottom of the trench a wide stone; then fixing the plant on this, they immediately throw on the mould. Some also plant the most generous of the suckers with the stem. Some likewise prune the plants they are going to take with a pruning-knife, while they are on the stem, and they set them in the trenches about the rising of Arcturus[m]. Others plant

[l] This passage seems to be of questionable authenticity.

[m] Columella says it rose on the nones of September; Pliny says it rose about a week later.

plant what are called *tropæa*[a] in this manner: having marked them with red earth, how they stand to the east and to the south, they saw them from the stem, four or five cubits; and they set them in the trenches, bestowing on them every due attention. This mode of planting, if it succeeds, quickens more readily, and produces fruit more speedily. Some also plant thus from stems: having cut the stems into sizeable pieces, they lay the pieces, having the bark upward, in the trench, and having laid on mould with compost, a palm high, they let them remain. Some likewise having cut off thin pieces four palms long, with the bark from the part of the stem under ground, lay a stone at the bottom of the trench; and they lay three or four of the thin pieces round it; and they cover them a palm deep. In what way soever the plantation is effected, let the plants be sawn; and you are carefully to observe, that the bark may not be lacerated; and you are to trim the wound with a sharp knife, keeping the bark closely cut; and you are to smear the lower end of the cutting with cow-dung mixed with ashes. It is also necessary to observe

[a] From their resemblance to the trunks, called *trophies*, so called, because they were fixed where an enemy had been turned to flight.

observe, that the cutting may not be set with its head downward; for we torture the plant when we set it thus inverted. It is moreover requisite to throw manure into the trenches.

XII.—THAT THE FRUIT OF THE OLIVE MAY NOT FALL OFF.

THE fruit of the olive will not fall off, if taking a bean that is faulty, you stop the faulty° part with wax; then taking a clod from the root, and setting the bean, you are to cover it.

XIII.—CONCERNING THE PRUNING OF OLIVES.

IT is right to prune the olive after it is disburthened of its fruit; and do not persuade yourself that the fruit is more scanty, when considerable branches are removed; for you will have a more abundant crop of fruit from the young shoots.

XIV.—CONCERNING THE OLIVE GRAPE.

IT is worthy of observation, and we must not pass by without taking notice of the attachment of the olive to the vine, which Florentinus mentions

° The hole, in the Greek.

tions in the eleventh book of the Georgics: for he says, that if any person grafts the olive on the vine, not only clusters of grapes grow from it, but olives also: and he says that he saw such a tree at Marius[p] Mascimus's, and that he tasted of the fruit, and that it seemed to taste at the same time of the grape-stone and of the olive kernel. He also says that such plants grow in Libya, and that they are in the language of that country called *oubolima*[q]. You are also to set poles underneath, strong enough to support the weight of the olive; but if we graft another way, we may have no need of poles: for having bored the vine to the ground, we may set in the olive shoot, that it may participate of the sweetness of the vine, and of the natural and nutritious quality of the ground. But we shall receive its fruit with less trouble, when it does not bear on the vine, if we take shoots from it[r] and transplant them; for when rooted by itself, it will preserve its mixed flavour, and the fruit from it is called the olive grape.

XV.

[p] A prefect of the city, A.D. 218. Dio Cassius, lxxviii. 14.

[q] A corruption from *uvoliva*, by changing the *v* into *b* and *m*, which were called letters of the same organs. The word seems adapted to the genius of the Arabic.

[r] After it has been grafted on the vine.

XV.—CONCERNING MANURE ADAPTED TO THE OLIVE.

Every kind of manure is suitable to the olive except human fæces; but you ought not to throw the manure down on the roots, but at a little distance from the stems; and it is proper to manure the olive-trees during two or three years; and he that plants the olive ought by all means to throw manure into the trenches, and to mix it with the mould.

XVI.—CONCERNING THE GRAFTING OF OLIVES.

Some olive plants indeed have a thin, and some a thick bark. You are then to graft those that have a thick and moist bark, in the bark; and those that have a thin and dry bark, in the wood. But the time of this grafting is from the calends of June, that is, from the twenty-second of the month of May, to the calends of June. It is also proper frequently to water the olives that have been grafted, when they are dry; but some also graft them on the roots that remain out of the ground.

XVII.—HOW AND WHEN IT IS NECESSARY TO GATHER AND TO HARVEST THE OLIVES.

THE proper season for the preparation of the common oil is when more than half of the fruit appears to be getting black. But it is necessary to accelerate the gathering before the frost sets in, for the trees will afford a less[*] laborious and a more abundant crop. But it is necessary to gather the fruit when it is fine weather, and not rainy; for a wet shoot is weak and easily broken; on which account it is neither proper to disturb the branches, nor to gather the fruit, when small rain falls, before the wet is thoroughly dried[†] from the plants: and where the soil is miry, you are to spread a mat or some such thing; but if you have nothing of this kind, it is proper to wash the olives with warm water; for, besides the cleaning of them, we shall likewise find more oil. Wherefore, if it be possible, although they may not be dirty, it is proper to wash them with warm water. Some, acting with propriety, only shake the branches with their hands, that the fruit may drop, and they do not apply a stick to

[*] Because the olives might be pressed with less trouble.

[†] Removed, in the Greek.

to the olive, because it afterwards bears more scantily; but the fruit coming down with violence is wounded, falling upon stones or upon hard clods; and partaking of the quality of the soil, it will make the oil feculent. It is necessary then to prepare triangular scaffolds, and to lay a wide board upon them, that standing upon it they may gather the olives.

XVIII.—HOW OIL MAY BE MADE WITHOUT OLIVES.

The fruit of the Terebinthus[u] being ground in the mill as the olive, and being pressed, produces oil: and the refuse does[v] for pigs to eat, and for burning. Sesamus[w] also makes oil, and the walnut, the shell having been removed, that is, when they are pressed.

XIX.—THE MAKING OF OMPHACINE OIL.

It is yet proper to know from[x] the signification of the term, that the premature olives make the omphacine

[u] Turpentine tree.

[v] Ποιει.

[w] The oily grain.

[x] Ομφαξ signifies a grape, but here an olive, before it comes to perfect maturity.

omphacine oil. When you then see the olives beginning to exhibit signs of maturity, order the boys or the labourers to gather them from the tree with their hands, observing that none of them may fall on the ground: and it is proper to take every day such a quantity as may be wrought the following night, or the night after. Spread them however, when gathered, on light hurdles, that the watery moisture that is in them may be dried, and that no injury may arrive from their heating: and you are to gather the leaves and feculence among them; for these things being mixed are adverse to the keeping of the oil: then taking the olives in the evening, besprinkle them with salt, and put them into a mill, which is clean, and grind them gently with your hand, that the refuse of the olives may not be ground along with them; for the watery fluid from the refuse injures the oil. It is therefore necessary that the wheel may be turned round briskly and lightly, that the flesh and the skin of the olive may be only pressed; and after the grinding, carry what is ground in small trays to the press, and lay in frails made of willow, for the willow contributes much to the beauty of the oil; then lay on a light and not a burthensome weight, for what flows from light pressure is very sweet and very

thin,

thin, which, when you have drawn it into clean vessels, order to be kept by itself: press again the olives that are left, and lie underneath, with a little heavier weight; and keep this also by itself, for this indeed will be a little inferior to the first, but better than what follows. But it is proper to throw a little salt and nitre to both of these, when they are drawn into another vessel, and to stir them with an olive stick, and let them afterward remain until they subside, and you will be sure to find the watery fluid rest at the bottom, that is, the amurca, and the richest fluid swimming on the surface above it, which it is expedient to take without the amurca, and to pour into a glass vessel; for the glass being naturally cool, will keep the oil exceedingly well; for the nature of oil likes the cold: but if you have no glass vessels, pour it into new jars smeared in the inside with gypsum, and set them in dry situations toward the north; for oil likes to be in a dry and cool place; for heat and moisture are inimical to oil.

XX. — PREPARATION OF SWEET-SCENTED OIL.

Put into a jar during ten days eight sextarii of sweet wine, that is, of that which is called

 must,

must, and two sextarii of oil, and a good quantity of pounded iris, having tied it: and afterwards use the oil, having percolated it. This liquor is fit for women to drink.

XXI.—HOW ONE MAY MAKE OIL FINE.

HAVING heated salt on the fire, throw it into the oil, while it is hot. The cone of the pine, when burnt and thrown in hot, does the same thing, as do the root of the citron, and the parched fæces of the oil.

XXII.—TO CURE RANCID OIL.

BOIL white wax with good oil, and pour it in while it is liquid: and having heated some salt, throw it in, while it is hot. But it is proper to know that you are to keep every oil in a place under-ground; and that fire, or the sun, or boiling water, if a brazen vessel, or some other that will not break, is set in it, makes oil fine. Anise thrown in will cure rancid oil: and if you take anise and throw it in, it will not become rancid.

XXIII. — TO CURE FŒTID OIL.

Having pounded some green olives without feculence, throw them into the oil vessel, when the sun is hot. But if you have no olives, having bruised the tender shoots of the tree, you are to do this. Some indeed throw both in, having tied them in a cloth, and having mixed them with pounded salt. But it is proper to take out the cloth after three days, and to stir the oil: and when it has settled, it is proper to pour it into another vessel. Others, having heated old bricks red hot, throw them in. Others having crumbled dry barley bread, and having wrapped it in a cloth of loose texture, throw it in; and having done this twice or thrice, they finally throw in some concreted salt, and they pour it again into a clean vessel. Others, having rubbed melilot with oil, lay it in the oil a day and a night.

XXIV.—TO MAKE TURBID OIL FINE.

Having poured the oil into a vessel having a wide mouth, set it in the heat of the sun; and when it is hot, besprinkle some fine parched salt over it; and when it has formed a sediment, pour

it into another vessel. You will also make feculent oil clear in this manner: having pounded the bark of the olive, and some of the sprays, and salt, and having tied them all in a cloth, suspend them in the vessel.

XXV. — IF A MOUSE, OR ANY OTHER ANIMAL, HAVING FALLEN INTO THE OIL, HAS HURT ITS FLAVOUR.

Suspend a handful of coriander in the oil, and if the unsavoury smell remains, change the coriander. Some indeed, having dried the coriander in the shade, and having pounded it, throw it into the oil. Others having dried fenugreek in the sun, lay it in the vessels: but it is better to extinguish the red-hot coals of olive wood in the oil. Others take dried grapes without the kernels, and pounding them, throw them in; and after ten days they take and press these grapes, and they pour the turbid oil into another vessel. Others likewise, having pounded dried grapes in a mortar, the kernels having been left, throw them into the oil.

XXVI.—TO MAKE OIL LIKE SPANISH OIL.

Pour a triple quantity of water, not too hot, and a little salt pounded and well mixed with it, into oil clear from amurca, quite hot; and moving and stirring it, that the whole may be well mixed, suffer it to rest some time, until the water that is poured in may subside in the manner of amurca: then taking the oil on the surface with a vessel, that is, with a skimmer[y], and again stirring it in the same manner with warm water, and doing the same thing, remove the remainder of the clear oil: then mixing the juice of tender leaves of the olive pounded, that it may take away a certain sharpness and bitterness, with the subsiding oil, use it after three days, or even the same day. But others pouring omphacine oil, or some other good oil, into a mortar, work it around; and when it is necessary, they use it as Spanish oil.

XXVII.—TO MAKE OIL LIKE ISTRIAN OIL.

Throw into omphacine or other good oil, some dry elicampane, and laurel leaves, and dry cyperus,

[y] Κογχη; thus called, because made in the shape of a shell.

perus, all pounded and made quite fine; then mixing them by sufficiently stirring them: when it has subsided, keep it during three days or more, and boil it down to a third part. This is what is called Liburnian oil, and the Istrians[z] give it this name.

XXVIII.—THE BEST COMPOUND OF OLIVES.

TAKE large and whole olives gathered with the hand, cut them around with a sharp reed, and so throw them into a new vessel not yet pitched, and sprinkle some very fine salt over them; and when it is dissolved, have some honey in readiness in another vessel, if it is indeed convenient, but if not, some sapa and citron leaves, and pour the olives into this preparation so that the liquor may cover them. But some likewise mix with the preparation fennel seed, and carnabadium[a], and parsley seed, and anethum[b]; and they make the olive compound altogether admirable, which is to many persons unknown.

XXIX.

[z] Istria lay on the coast of the Adriatic, between Liburnia and Aquileja.

[a] Ethiopic Cumin. [b] Dill.

XXIX.—OXYMEL COMPOUND OF OLIVES.

TAKE the long olives with the shoots on which they grew, the best, and those that are black, wholly unhurt; then washing them with cold water, dry them on hurdles; and so throwing them into a hollow tray, pour oil on them, and sprinkling one chœnix[c] of pounded salt over nine times that quantity, move them gently with your hands, that they may not be bruised: then throw the olives into the vessel, pouring oxymel over them, and let the liquor cover them; and having then closed them with sprigs of fennel, lay them by.

XXX.—THE MUST COMPOUND.

HAVING gathered the white olives, they macerate them in sea-water during six days; they then lay them in a vessel, and pour fresh must upon them; but they do not wholly fill the vessels, that the must may not, in fermenting, run over; and when it has fermented, they stop it. Some indeed, first throwing in a handful of salt, pour in the must, and then the olives; and when it has fermented, they stop it.

[c] 1 pint 15.705½ sol. inches.

XXXI.—OLIVE COMPOUND WITH REFUSE OF GRAPES.

Pour the fresh relics, before they are pressed, into a vessel, alternately with the olives; then stop it.

XXXII.—CONCERNING POUNDED OLIVES.

Having taken the more healthy olives, before they become black with ripeness, and having bruised them in a wooden vessel, throw them into hot water; then having taken them in a basket and pressed them, throw on some salt, not well pounded, and having laid on a handful of salt, close them with sprigs of fennel. Others, having bruised the olives, take out the stones, and sprinkle some pounded salt with cumin and sprigs of fennel over them; they then pour in some good must, and they stop them.

XXXIII.—CONCERNING THE OLIVES CALLED COLUMBADES.[d]

Taking the large olives called *columbades*, when they are come to perfection and turn black, with

[d] So called from the circumstance of their swimming in the brine: they were sometimes called νηκτρίδες. Athenæus says,

with the pedicles on which they stand, be careful that, when they are thrown into a large vessel, when they are removed, they may not be bruised: then washing them in cold water, dry them gradually in baskets[e] in the shade for a day, and turn them gently, that they may be equally dried; then throw a handful of parched salt into the bottom of the vessel, and pour in four congii of the second[f] pickle with three cotylæ of vinegar, and throw in twenty chœnices of olives, and fill the vessel, and stir it: and let the liquor come to the top; then, closing it with fennel, stop it. But we have prescribed that the pickle ought to be first poured in, that the olives, when thrown in, may not be bruised. But others, taking them with the tenderest shoots, throw them in a vessel having sea-water; and letting them remain during four or five days, they take them up, and throwing them into vessels with pickle, they stop them. But these things are done before the winter solstice.

the ancients used food, to whet the appetite, as well as pickled olives, which they call *columbades*. Lib. iv. p. 133.

[e] Called ταλαροι. They were used by the Greeks for this and for other common purposes.

[f] The oxymel recommended in the 29th Section.

END OF VOL. I.

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ΓΕΩΠΟΝΙΚΑ.

AGRICULTURAL PURSUITS.

BOOK X.

HYPOTHESIS.

These things are in this Book, being indeed the Tenth, relating to the choice Precepts of Agriculture, and comprising the method concerning making a garden, and the enjoyment and pleasure[a] arising from it, and when it is proper that every tree should be planted, and what trees become more useful when grafted, and which are more useful when inoculated.

I.—CONCERNING A GARDEN.

A PERSON who wishes to have a garden ought to choose a situation that is fit, if indeed it can be done, within the precincts;[b] but if not, quite near, that pleasure may not only arise from the

[a] Luxury, in the Greek.

[b] "Of the villa," seems as if omitted after this word.

sight to the persons within doors, but that the circumambient air also, impregnated by what exhales from the plants, may render the possessor's house salubrious. But you are to throw up a wall[c] around it, or some other fence, with due care: and let not the plants be set without arrangement, or promiscuously, for diversity of plants produce elegance; but let all the plants be set apart according to their kind, that the least may not be overpowered by the greatest, or that they may not be deprived of the benefit of nutrition: and let the intervals between all the trees be filled with roses, and lilies, and violets, and the crocus, which are very pleasant to the sight and to the smell; and they are very useful, and profitable, and they are of advantage to the bees. You are also to take the plants from trees that are in full vigour and unhurt: and it is proper to know that the plants from seed are generally the worst of all plants; and that suckers[d] are more eligible; and that plants that are grafted are better than these, not only for producing good fruit, but plenty, as well as a speedy crop of it.

[c] Περιϐλητεον δε αυτον θριγγω. The last word sometimes signifies a wall, sometimes a hedge.

[d] Μοσχευματα. The word, when duly considered, carries great force of expression.

II.—AT WHAT TIME IT IS NECESSARY TO PLANT TREES.

The autumnal season is the best adapted for planting, and especially in dry situations, for the plants are watered during all the winter. It is proper then, as soon as the showers fall, immediately to plant after the setting of the Pleiades to the winter solstice, that is, from the seventh[e] or eleventh of the month of November, to the twentieth of the month of December. All the authors who have written on agricultural subjects have, to a man, prudently chosen the season of the autumn as well adapted, and the Quintilii say so. But you are to plant in the spring such trees as you have not previously planted in the autumn: and I learning this from correct experience, planting indeed at this season many vineyards in the Maratonyme[f] villa, and in other grounds of mine in the neighbourhood, have reaped a consummate profit. Having also planted a great many trees that produce fruit[g] with

[e] Columella fixes the setting of the Pleiades on the eighth of November.

[f] From this passage, this chapter ought to be ascribed to Cassianus, and not to Florentinus. Lib. v. c. 6.

[g] Ακρόδρυα, fruit which had a hard shell, as nuts, &c.

hard integuments, and other fruit, in the autumn, I acknowledge my obligation to the season: all therefore who are in our part of the country, seeing my good fortune from this method, no longer make their plantation according to the old custom in the spring only, but rather in the autumn, following my instruction. But while experience seems sufficient, I think it necessary likewise to give a reason why I rather practise the mode of planting in the autumn. Deign then to be informed, that nature cannot at the same time do two things that are incompatible; but it necessarily follows that while it is employed about the one, it must neglect the other: as in the instance of planting; at one time indeed it administers aid to the upper parts of the trees, at another it nourishes the parts beneath, I mean the roots. It is then evident that, as it has been used to cherish the upper parts of plants in the spring, trees therefore then blossom and bud: but it is quite the contrary in the autumn; for indeed the higher parts are no longer cherished, but they cast off their leaves, and the roots are fostered by nature. It is therefore necessary to choose that season for planting in which nature is employed about the roots. It is proper indeed to plant all trees, as well as the

vine,

vine, when the moon is under the earth: and if a tree is planted when the moon increases, it will grow very much; but if when in the wane, it will be short indeed, but it will be the stronger.

III.—WHAT TREES YOU ARE TO PLANT FROM SEED, AND WHAT FROM SUCKERS, AND WHAT FROM TRUNCHEONS, AND WHAT FROM LAYERS.

THE methods of planting trees are various: for some trees are usefully raised from seed, and others from shoots called suckers; and some from truncheons, and some from layers.[h] It is therefore necessary to explain the methods whereby every tree ought to be planted. From the seed then are indeed raised, the pistacia, the small nut, the almond, the chesnut, the duracinum,[i] the damson, the strobilus,[k] the palm, the cypress, the bay, the apple-tree, the maple, the fir, the pine; but these, when transplanted, will be better. But from young shoots or suckers are planted apple-trees, and such things as the cherry and the zizyphus, the small nut, the small bay, the myrtle, the medlar. Shoots, or what are called suckers, are

B 3

[h] Branches, in the Greek.

[i] A peach thus called. See c. 13.

[k] Supposed to be a species of pine.

are those that are united to the trees, and they are taken from them with a considerable portion of root: but the shoots and the suckers ought to be transplanted. But these are planted from truncheons and layers: the almond, the pear, the mulberry, the citron, the apple, the olive, the quince, the black and white poplar, the ivy-tree, the zizyphus, the myrtle, the chesnut; and these, when transplanted, will be better. The trees also that may be planted from suckers, and from layers and truncheons, are these: the fig, the mulberry, the citron, the pomegranate, the olive, the sycamore, the white poplar, the pricked myrtle, the quince. But these are planted from layers and truncheons only, for they cannot be propagated from suckers, because they throw none from the roots: the vine, the willow, the box-tree, the cytisus. Those that may be raised both from seed and suckers are these: the apricot, the damson, the almond, the palm, the pistacia, the plane tree, the bay.

IV.—CONCERNING THE PLANTING OF PALM-TREES.

Having dug a trench two cubits deep, and of the same breadth or more, fill it in part with

mould

mould mixed with goats dung, leaving a depth of half a cubit; then setting the seed in the middle, and having the pointed end of it toward the east, lay on mould mixed with manure and salt, and water it every day until it shoots. Some indeed transplant it, and some let it remain in its place; and as it likes a soil impregnated with salt, it is proper to dig around it every year, and to throw in some salt; for thus the plants will speedily grow to a good size. They also flourish with more vigour when manured with the lees of old wine. But it is not proper immediately to sow the seeds of palms in the ground, but at the bottom of a jar, and then to transplant them. The palm-tree also betrays affection, and that to a degree of ardour, for another palm, as Florentinus says in his Georgics; and it will not desist from shewing it, until the male plant with which it is enamoured consoles it: for you may see the tree as if in a state of suffering, and neither standing firm, nor bearing fruit. This escapes not the notice of the cultivator, but he is convinced that it betrays affection, and that it is mutual, but he knows not the object; he therefore touches many palms, and returns to the affectionate tree, and touches it with his hand, and thus seems to relieve its passion. With which

male plant indeed it is captivated, it exhibits by a certain sign of passion and of demonstration, as one may express himself, for it points to it, and directing its roots towards it, it does, as it were, with eagerness embrace it. Relief is therefore administered to the affectionate female plant, by the cultivator's frequently touching the male, and by applying his hands to the impassioned female; most effectually, if he takes the flower from[1] the bearing branch of the male, and places it on the top of the female; for thus he mitigates its passion, and the tree, thus invigorated, will for the future produce very good fruit.

V.—CONCERNING THE METHOD BY WHICH THE FRUIT OF THE PALM-TREES FLOURISHES.

THEIR fruit indeed thrives, when the empty hulls, which some call integuments, are taken when in flower and dried, and are hung on the stems, as the wild figs are on fig-trees.

VI.—CONCERNING PALM-SHOOTS, AND THE USE OF THEM.

PALM-TREES flourish and grow high, when the lees of old wine are percolated and poured on the

[1] Απο της σπαδης.

the roots; and salt thrown on them is useful. But that the shoots may be white and fit for the making[m] of baskets and panniers, let us gather them green from the branches; and let us lay them during four days under cover; and let us afterwards suffer them to be exposed to the dew, and to be dried in the sun until they become white.

VII.—CONCERNING THE SEASON FOR PLANTING THE CITRON, AND THE CARE OF IT; AND HOW CITRONS ARE TO BECOME RED.

YOU are to plant the citron from autumn to the vernal equinox: and it likes plenty of moisture; and this above all trees is aided by a southern aspect, and it is hurt by the north wind. But when the crop of fruit is heavy, it is proper to gather a great part of it, and to leave few, for thus they are better nourished. But it is necessary to plant these against walls, that they may be defended from the north: and they are covered during the winter with mats, and very commonly with the haulm of gourds, for it has a certain natural resisting power to keep them unhurt in the cold. Having moreover burnt the more substantial and the thick shoots of the gourds, it is

proper

[m] Weaving, in the original.

proper to scatter the ashes over the roots of citron. But if the fruit of the citron is set in an earthen or in a glass vessel, before it is grown to perfection, it will in growing be formed according to the vessel, and it will grow in proportion to the size of the vessel; for the fruit seems to have a tendency to this; but it is necessary to afford the vessel vent-holes. It is also proper to know, that the citron, when inoculated, is steril; it is therefore proper to graft it in the wood in the same manner as you graft vines. But if you wish to make citrons black, graft a branch of an apple-tree with the citron, and *vice versâ;* and the apple may become so, the citron-tree having been thus grafted, and *vice versâ.* If you also cover the fruit with well-wrought gypsum, you will preserve it unhurt all the year. This plant, if it is touched by the frost, being naturally tender, when[a] frost-bitten perishes. Some of the rich and luxurious indeed plant their citrons against the wall in houses[b] facing the sun, and they give them plenty of water: and in the summer they leave the houses uncovered, affording the plants the benefit of the sun; and when the winter approaches, they cover the plants. But if you wish to make citrons red, graft them on the [illegible] mulberry, [illegible]

[a] Καυμενον; literally, burnt.

[b] Υπο στοαις, under porticos.

mulberry, and *vice versâ*, and the citrons become red; and the tree will produce either of the kinds of fruit. The citron is also grafted on the pomegranate.

VIII.—ANOTHER CONCERNING THE PLANTING OF THE CITRON.

But some plant citrons not only from truncheons, but from layers also: a branch having been bent, two parts towards the extremity are fixed in a trench, and they are covered with earth; and they throw out a shoot, as one may say, from the incurvated branch. Some likewise plant the short truncheons of citron plants, that cannot be bent, inverted with the thick end upward, and fixing the small end in the ground; and they throw in the ashes of the refuse of cucumbers along with them.

IX.—TO MAKE THE CITRON BEAR THE REPRESENTATION OF ANY BIRD, OR TO IMITATE THE FACE OF A MAN, OR OF SOME OTHER ANIMAL.

You will make the fruit already mentioned represent the form of the face of a man, or of some

some other animal, in this manner: having covered it[p] with gypsum or with clay, and having left it to be dried; and having made it into two parts, the one anterior, the other posterior, so that they may fit when they are dried; burn them as you do earthen ware. When the fruit comes to half its growth, set on the moulds, and secure them by carefully tying them, that they may not be parted by the growth of the fruit, whether it is a pear, or an apple, or a pomegranate, or a citron, and it will receive the form; and in short, fruit assumes the resemblance of animals, if[q] a person lays it in carved moulds, and suffers it to grow.

X.—CONCERNING PRESERVING AND LAYING UP CITRONS.

If you carefully cover the fruit with well-wrought gypsum, you will keep it unhurt and untainted all the year; and you must know that citrons, when covered with barley, do not putrify.

XI.

p The face.

q In the Greek it runs thus: "Wherefore let a person, laying it in carved moulds, suffer it to grow."

XI.—CONCERNING THE PLANTING OF PISTACIA-TREES.

TAKE the seed without shelling it, that is, having all the parts whole, and plant it in* the usual way. Didymus says in his Georgics, that the pistacia is grafted on the almond-tree.

XII.— ANOTHER CONCERNING THE PLANTING OF PISTACIA-TREES.

PISTACIA-TREES are sown about the calends of April; the male and female having been naturally wedded, the male having his back to the western breeze, for thus they will produce perfect fruit. They are also grafted in the same season on their own kind, or on the terebinthus, and I believe on almond-trees. Paxamus says that you are to make trenches in places well exposed to the sun, well wrought; and to take the suckers of trees that are perfect and young, and to tie them together; and to set them in the trench the second day of the moon's age; and to confine

* "In a way already mentioned," in the Greek. The passage is supposed to refer to a method which had been prescribed in some part of the works of Diophanes.

confine them from the ground to the branches; and to manure the trench; and to lay on earth, and to dig around them; and to take care that they are watered at the expiration of eight days, and that they are tied again on those days. But when the trees[s] are three years old, you are to dig the trench well near the roots, and to manure it, and to make the stem lie lower; and to lay on mould, that when the tree becomes large, and the wind blows powerfully, it may not fall.

XIII.——CONCERNING THE PLANTING OF THE DURACINA[t], AND THE CARE OF THEM.

THE duracina like wet situations, or such as are continually watered, for thus the fruit grows larger. Some indeed gather many of the peaches, and they leave but few on the tree; for they will thus be larger, the nourishment being conveyed to these few. The plants also increase, if we immediately set the stone after eating the fruit, leaving some part of the fruit on the stone: as we then know that the duracinum soon grows old, we ought to graft it on the damson, or on the

bitter

[s] Stems, in the Greek.

[t] Δωρακινα. Gruterus says that these peaches were so called from Dora, an island in Persia.

bitter almond, or on the barbilus. The tree which grows from the stone of the peach is indeed, by way of eminence, called the barbilus.

XIV.—TO MAKE PEACHES GROW WITH MARKS ON THEM.

WE shall make a peach have inscribed marks in this manner: when you have eaten the fruit of the duracinum, macerate the stone during two or three days, and open it gently; and taking the kernel, that is found in the stone, inscribe on the skin of it with a brazen stylus what you please, not deep; then wrapping it in papyrus, plant it; for whatever you have inscribed on the kernel you will find in the fruit. Some indeed do this on the almond.

XV.—TO MAKE THE DURACINA RED.

YOU will make the duracina red by setting roses under the plants. You will also make the fruit red another way; for if having covered the stone of the peach you take it up and open it, after seven days (for it opens spontaneously in that time), and you pour cinnabar[a] into it, and

set

[a] Dioscorides says that the cinnabar of the Greeks was brought from Africa; Matth. v. 69.

set it, and take care of it, you will have the fruit red. It is equally practicable if you pour in any other colour, and you will make the fruit assume that colour.

XVI.—TO RAISE PEACHES WITHOUT STONES.

HAVING perforated the stem in the middle, and having penetrated the pith, fix in a piece of willow, or of the cherry-tree.

XVII.—CONCERNING THE GRAFTING OF PEACHES.

THE duracinum is grafted on the almond, the damson, and on the plane-tree, from which circumstance the fruit becomes red.

XVIII.—CONCERNING THE SEASON FOR PLANTING APPLE-TREES, AND THE CARE OF THEM.

You are to plant apple-trees at two seasons of the year, in the spring and in the autumn; but it is better to plant in the autumn in dry situations after the first showers. Apple-trees indeed like cool and moist situations, and a black soil: and they will not be hurt by worms when the squill is planted

planted about them. You will also cure a tree infested by worms, by pouring hogs dung, moistened with urine, around the roots; for the apple-tree is very partial to urine, and you ought assiduously to apply it. But some add goats dung to the urine, and they pour the lees of old wine on the roots, thus rendering the fruit sweeter. You will also cure an apple-tree with asses dung, rendered soluble with water; watering it during six days at sun-set, at certain intervals, until it shoots. But if you wish it to bear much fruit, and not to shed it, cut off a wide piece of a leaden pipe, and tie or fix it around the stem a foot from the ground; and when the fruit begins to come to perfection, remove the cincture; and let this be done every year, and the tree will flourish. But that the fruit may not rot on the tree, and that the caterpillar may not touch it, smear the stem around with the gall of a green lizard. It is also necessary to take the most generous plants of the apple-trees that are rooted, and to set them in the trenches, the extremity only being left above ground; and you are to smear the roots of the plant, before setting it, with bull's gall, for this plant is very soon hurt by the worms. It is also proper to remove the worms that are troublesome with a brass spike, and to divide the bark

until the noxious animal is found; and you are to cover the wounded places with cow-dung.

XIX.—TO MAKE APPLES RED.

Let the tree be watered with urine, and the fruit grows red. Some indeed make the fruit of apple-trees red in this manner: having fixed stakes in the ground, and bending the branches having fruit on them, they tie them regularly to the stakes; and they fill trenches or vessels near them with water, contriving that the rays of the sun falling on the water at noon, and raising a warm vapour, and falling on the fruit by reflection, may make it of a good colour and ruddy. Some also set roses under the plants, to make the fruit red.

XX.—CONCERNING GRAFTING APPLE-TREES.

The apple-tree is grafted on every kind of wild pear, and on the quince; and the most beautiful fruit grows from the quince-trees, called by the Athenians the sweet-apple[v]. Apples are also grafted on the plane-tree, on which the fruit grows red: and Didymus says in his Georgics, that

[v] Honey-apples, in the Greek.

that apples are properly grafted on damsons, and that an apple grafted on the citron bears almost all the year.

XXI.—CONCERNING THE KEEPING OF APPLES.

Apples, when gathered in a state of perfection, keep during a long time; but it is proper to gather them carefully with the hand, that they may not be bruised: and it is proper to wrap them in sea weed, that is, in sea moss, so that they may be thoroughly covered, and to lay them in fresh* pots, and to lay sea weed between the apples, that they may not touch each other, then to stop the pots. It is also proper to place them in an upper room, and one that is cool, free from smoke, and from all unsavoury smell. But if there is no sea weed, you are to lay every apple by itself in small pots, that have not been burnt, and you are to lay them up when you have stopped them. Some indeed, having covered each apple with potters clay, dry it, and lay it up. Apples will be preserved, having their genuine flavour, when the leaves of the walnut-tree are strewn under them; for they contribute much to the goodness of their colour, and to the ex-

 cellence

* Earthen pots, that had not been burnt.

cellence of their flavour. But you will do better, if, having wrapped each apple in walnut leaves, you lay it up. You may keep apples, if you lay them in pots that are internally covered with wax, stopping them with care. Apples also laid in barley keep sound. You will also keep apples thus: take an earthen vessel, that is not pitched, with a hole in the bottom of it; fill it with wholesome apples, that have been hand-gathered, not grown old; and having well covered the vessel with rock[*] asparagus, or with something else, hang it on any tree, and let it remain during all the winter, and the fruit will remain as it was put in: and I have learned this from experience. Apples are also thus preserved: wrap each apple in dry fig-leaves, then cover them with white potters clay, and lay them up when dried in the sun, and the apples will remain as they were put in. Apples thrown into must will keep, being preserved by the lees, and they will preserve the wine and make it have a sweeter flavour, to every body's astonishment. Being also laid in a new pot, and the pot being put into a wine-cask, so that it may swim, and the cask being stopped, they will be quite fresh, and the wine well-flavoured. They are also laid in baskets with clean [illegible] locks

[*] Called rock, or wild asparagus. Dioscorides, lib. ii. c. 118.

locks of wool, and are preserved: and the winter apples are best kept in seed[y], in which, as we have already taken notice, grapes are kept. Smear the extremities of the apples with the juice of green satyrion[z], and they do not decay.

XXII.—CONCERNING THE PLANTING OF PEARS, AND THE CARE OF THEM.

HAVING first gathered up all the stones from the trenches, set the plant; and having covered it with sifted mould, water it: but if the tree has been previously planted, uncover it to the bottom of the roots, pick up all the stones, and having sifted the mould that was dug up, throw it in with manure; and having laid it on, water it. The pear indeed likes cool and wet situations; and it is propagated not only from quicksets, but from suckers also that are taken up. But if you are going to set quicksets, let them be three years, by no means less than two years old. But some make truncheons from the most eligible parts of the stem, and plant them; and some taking the most

 thriving

[y] Pliny says they were kept in the seed of millet. See Palladius, iii. 25.

[z] Two species of this plant grow upon the Alps, and one near Verona. It is described by Matthiolus, iii. 126.

thriving branches, that is, the most generous, from the upper part of the trees, plant them, and they succeed.

XXIII.—ANOTHER CONCERNING THE PLANTING OF PEARS.

THE pear likes cool, and wet, and fertile countries: but it consists of many species; and it therefore requires various modes of planting; for it is certainly proper to plant the large kinds, that are long and round, which ripen their fruit on the tree, earlier; but you are to begin to plant the other kinds from the middle of the winter till the middle of the spring. They are also planted in situations that have good air, and inclined to the east or to the north; and they are propagated not only from suckers, but from quicksets[*]; and let the quicksets be not less than two years old; and cover the roots with earth mixed with dung. Some indeed, acting with more judgment, graft rather than plant them; and transplanting wild pear-trees with roots, or some other plants of the kind, from healthy situations, they set them in the manner already mentioned; then, when the plants

[*] Plants having their own roots, and not taken from a tree as suckers and layers.

plants have taken root, they graft what kind of pears they please on them. But if you wish to render the fruit sweet, and the tree to bear more abundantly; having perforated the stem to the ground, drive in a piece of oak or of beach.[b] You will cure it if unhealthy, when it blossoms, by pouring the lees of old wine on the roots, and watering it during fifteen days; then cover the roots, and if it is not unhealthy, you will render the fruit of a sweeter flavour by pouring the lees of wine on the roots: and the fruit will not be hurt by worms, if the roots, when they are planted, are smeared with bull's gall.

XXIV.—CONCERNING THE GRAFTING OF PEARS.

The pear is grafted on the pomegranate, and on the quince, and on the almond, and on the terebinthus, and on the mulberry; and when grafted on the mulberry, it produces red fruit.

XXV.—CONCERNING THE KEEPING OF PEARS.

Having covered the pedicles of the pears with pitch, hang them up. Others indeed throw the pears into a new earthen vessel, and pour sapa

[b] In some copies the Greek is φυτυ, *i. e.* of the plant.

must, or wine on them, so that the vessel may be filled, and they lay it by. Others have preserved their pears by laying them in saw-dust. But some lay them in dry walnut leaves. Others, having poured some sapa and wine, and must, into a new earthen vessel having a little salt, put in the pears, and having stopped the vessel they lay it by. Others likewise lay them in[c] the lees of sweet wine, at some distance from each other.

XXVI.—CONCERNING THE PLANTING OF QUINCES.

Quinces are planted in the same season and manner prescribed for cherries.

XXVII.—TO MAKE THE QUINCE ASSUME ANY APPEARANCE.

Quinces assume the appearance of animals, if you let them grow in[d] moulds.

XXVIII.—CONCERNING THE KEEPING OF QUINCES.

Quinces put in must keep, being preserved by the lees; and they will preserve the wine, and they

[c] In the kernels, in the Greek. [d] c. 9.

they will make it better flavoured, to the admiration of every one: and being laid in a new earthen pot, and the pot being laid in a wine-cask, so that it may swim, the cask being stopped, the quinces will be fresh, and the wine well-flavoured; and they are laid in baskets with* clean wool. Quinces are likewise kept a very long time, when covered with saw-dust; for, being dried by the saw-dust, they are improved. They are also well kept when laid in straw. But you are not to keep these in the house where other kinds of fruit are laid; for lying near them, they hurt them by their acidity and smell, and especially the grapes. Some indeed, having wrapped the quinces in leaves, cover them round with white clay carefully mixed with hair, or with potters clay; and having then dried them in the sun, they lay them up: and when use requires it, having removed the clay, they find the quinces as they were set in. It is also proper to do the same with regard to apples. Quinces are also kept in barley, as well as in must.

XXIX.

* With clean locks of wool, in the Greek.

XXIX.—CONCERNING THE PLANTING OF POMEGRANATES, AND THE CURE OF THEM, AND EVERY DUE CARE OF THEM.

The pomegranate loves a warm air, and it is planted in dry situations: and it is necessary, when you plant them,[f] to set the squill along with them. They will also remain green on the tree till the spring, if you twist their stalks, that is, turn them around once or twice, when they are come to maturity, and lay dry gourds and turnips round each of them, that they may not be wetted, and that they may not be eaten by the birds. You will also cure such as are unhealthy, by covering the trunk near the roots with weeds thrown up by the sea, and by assiduously watering them. Diophanes says in his Georgics, that pomegranates grow red, if the roots of the trees are watered with a lixivium from the baths. Democritus also says, that the pomegranate and myrtle betray an affection for each other, and that, when planted near each other, they will bear plentifully, and that their roots become mutually implicated[g], although they may not be very near.

XXX.

[f] The transition, as in the Greek.

[g] *i. e.* entangled.

XXX.—THAT POMEGRANATES MAY NOT CRACK.

When you plant them, first throw flints into the trench; but if they be already planted, set some squills near them; for these, from contrariety of affection, prevent them from cracking. If they are likewise set inverted, the fruit does not crack.

XXXI.—TO MAKE THE POMEGRANATE GROW WITHOUT KERNELS.

If you take out a good part of the pith, as[a] in relation to the grape, and cover the divided wood with mould, and after some time cut off the upper part of the plant, which has shot, it will bear fruit without kernels.

XXXII.—A BRANCH OF THE POMEGRANATE KEEPS OFF VENEMOUS BEASTS.

They say that a branch of the pomegranate is inimical to venemous animals, and they deem it proper on this account to lay it in stacks of straw for security.

XXXIII.

[a] Lib. iv. 7.

XXXIII.—THAT POMEGRANATES MAY GROW RED.

If you wish to make the fruit of the pomegranate red, irrigate the plant with water, having mixed with it some lixivium out of the bath.

XXXIV.—HOW TO MAKE A POMEGRANATE THAT IS SOUR, SWEET.

Having dug around the roots of the tree, cover them with hogs fæces; and having laid on the mould, irrigate them with urine. But you will find something more finished in relation to this in[1] my third book of Georgics, in the twenty-seventh chapter.

XXXV.—THAT THE POMEGRANATE-TREE MAY PRODUCE MUCH FRUIT.

Having well pounded some purslane and spurge, smear the stem of the tree.

XXXVI.—HAVING GATHERED A POMEGRANATE FROM THE TREE, TO ENUMERATE THE KERNELS.

Having opened a pomegranate, enumerate the kernels; and as many as you find in one, so many

[1] In the third book of the Georgics of Paxamus.

many may each of the others contain; but to judge that a pomegranate is small or large, one cannot from the great or small number of the kernels, but from the greater or less size of them.

XXXVII.—CONCERNING THE GRAFTING OF THE POMEGRANATE.

The pomegranate is inoculated in a different way from other trees. Having chosen a flexible stem that may be bent down to the ground, they inoculate it as they do other trees, and they likewise secure it with bandages; they then bend it down to the ground, not touching the inoculated part, but that which is underneath; they besprinkle it with amurca, they cover it with earth, rendering it very secure, that it may not recoil, until the shoot[k] comes out. It is indeed proper to know that we take shoots from other trees before they sprout; but with regard to the pomegranate, even after it has sprouted: and as it has been before mentioned[l], the pomegranate betrays great affection for the myrtle, as Didymus informs us in his Georgics; where he says, if the pomegranate is grafted on the myrtle, or the

[k] Ενθισις.

[l] Chap. xxix.

the myrtle on the pomegranate, it will produce much more fruit. Wherefore the pomegranate is judiciously grafted on the myrtle, and on the willow, and the citron is grafted on the pomegranate, as Didymus says in his Georgics.

XXXVIII.—CONCERNING KEEPING AND LAYING UP AND PRESERVING POMEGRANATES.

It is proper to gather the pomegranates which you are to keep during the winter, with caution, that you may not bruise them, for this affords a beginning to putrefaction. Having then gathered them without the least injury, and having dipped the pedicles in boiled pitch, hang them up. Others dip the pomegranates, and having afterwards cooled them, hang them up. Wine is also prepared from pomegranates, and it is the most beautiful beverage. Others likewise, having secured each pomegranate in its shoot, and having tied them with strings, and having carefully smeared them around with gypsum, that the swoln fruit may not burst, permit them to remain on the tree. This may be also done with regard to apples. Others indeed lay them in oak saw-dust, previously pouring vinegar on it. Some also having heated sea-water, or having boiled some brine, dip the pomegranates in this; and having

afterwards

afterwards dried them in the sun, so hang them up; and when they are going to use them, they macerate them in water two days before. Others likewise suffer the pomegranates to remain for some time on the tree, and they confine each in a new earthen pot; and having stopped and secured them, so that they may not beat against and be hurt by the stems, nor one by another, they will have them fresh all the year. Pomegranates will keep during a long time, being dipped in clean hot water, and immediately taken out. You are also to lay pomegranates in dry sand, or in a quantity of wheat in the shade, until they become wrinkled.

XXXIX.—CONCERNING THE PLANTING OF DAMSONS.

The damson also loves a dry soil and a warm air; and it is planted in the same manner as the barbilus; and it is grafted in the same season and on the same days as the barbilus, but on trees of the same kind, and on the apple.

XL.—CONCERNING THE KEEPING OF DAMSONS.

Some indeed, putting them in vessels, pour new wine on them, and some pour on must; and

having

having filled and stopped the vessels, they leave them.

XLI.—CONCERNING THE PLANTING OF CHERRIES.

Cherry-trees are planted and grafted in the same manner as apples and pears; but this plant loves cool and wet situations; it is also partial to grafting; and the cherry-tree will not produce good and sweet fruit, unless it is grafted. If the black grape is likewise grafted on the cherry-tree, it will bear grapes in the spring.

XLII.—CONCERNING THE KEEPING OF CHERRIES.

Cherries being gathered from the tree before the rising of the sun, and being thrown into a vessel, some thymbra[m] having been previously laid at the bottom, then some cherries, and then some thymbra, and some sweet oxymel being poured on them, are kept: and they are also kept on the leaves of the sweet calamus.

XLIII.

[m] Called *satureia* in Latin; Matth. lib. iii. c. 38.

XLIII.—CONCERNING THE PLANTING OF THE JUJUBE-TREE.

THE jujube-tree is planted from shoots taken from the middle of the tree, as Didymus says in his Georgics.

XLIV.—CONCERNING KEEPING THE FRUIT OF THE JUJUBE.

THE fruit of the jujube is kept, being thrown into œnomel, the leaves of calamus being laid under and over it.

XLV.—CONCERNING THE SEASON OF PLANTING FIGS, AND THE CARE OF THEM.

FIGS are planted at two seasons of the year, in the spring and in the autumn: but it is better to plant the fig in the spring above all plants, for the plant being more delicate is very soon hurt by the frost and by the wind; you must therefore set it after the frosts in the spring. I indeed have planted fig-trees throughout the month of July, and have met with great success; and having transplanted and watered them, I had large trees

 that

that bore fruit from them; and from constant experience I have persevered to plant, not only in the spring, but in the month of July likewise. It is indeed necessary to plant figs in warm situations and in rich earth, but not watered, for much water destroys the natural goodness of the figs, and it makes them easily rot. It is also planted in another way; for if any one, having macerated the figs, lays them in a rope, and having planted, waters them, many plants will grow, which it is proper to transplant. But if any one sets the rooted plants of the fig-tree, it is proper to plant them with the squill. Some, having besprinkled the plant with brine, set it; but it is better, if any one is going to plant cuttings, to smear them with cow-dung. Others throw in some quick-lime after the plant, and this is attended with success. But it is proper to know that the fig-tree, when grown old, is more fruitful. Some throw in ashes, and some throw sinople[n] on the roots: but if you wish the fig-tree not to run too high, plant the cutting inverted[o]. The fig is also successfully raised from seed.

XLVI.

[n] By the Romans called *rubrica*; Matth. v. 71.

[o] Pliny makes the same observation, lib. xvii. 14.

XLVI.—THAT FIG-TREES THAT ARE PLANTED MAY BE FREE FROM WORMS.

The fig-trees will not produce worms, if, when you are going to plant, you fix the shoot in a squill; and you will destroy those that are in them, if you sprinkle lime over the roots, and into the hollow parts of the trunk.

XLVII.—TO MAKE FIGS HAVE CHARACTERS.

Inscribe what you please on the eye of the fig-tree which you are going to inoculate, and the figs will produce characters.

XLVIII.—THAT THE FIG-TREE MAY NOT CAST ITS FRUIT.

The fig-tree does not cast its fruit, if you take some mulberries and rub the trunk of it with them. It also does not cast its fruit, if you apply salt or sea weeds to the roots of it, or rub the trunk with rubrica, when the moon is at the full, or suspend sour[p] figs on it: wherefore some insert a shoot on each tree, that they may not be obliged

 to

[p] The fruit of the wild fig-tree, probably.

to do this every year. The fig-tree retains its fruit, if you dig trenches around it about the Pleiades[q], and having mixed an equal quantity of amurca and water you pour it on the trunk.

XLIX.—TO RECLAIM THE WILD FIG.

You will reclaim the wild fig, if, having cut the branches, you irrigate it with wine and oil, and well besprinkle it during seven days.

L.—CONCERNING AN IMPETIGENOUS FIG-TREE.

You will cure the impetigenous fig-tree by planting the squill near its roots, or by dissolving sinople in water, and smearing the stem all around.

LI.—TO MAKE THE FIG HAVE A CATHARTIC QUALITY, AND THE TREE TO PRODUCE EARLY FRUIT.

When you plant the fig-tree, throw over the roots some black hellebore pounded with spurge, and you will have figs of a cathartic quality. The figs also ripen before the usual season, if having

q It is possible the author means the rising of the Pleiades with the Sun in the spring, which was about the 22d of April.

having mixed pigeons dung, and pepper, and oil, you lay them on. Florentinus says in his Georgics, that the fig ripens early and heals the bite of venemous animals, when the fruit is smeared with the antidote theriaca. But if you wish to eat figs before the usual season, having[r] mixed pigeons dung and pepper with oil, rub the immature figs with them.

LII.—CONCERNING GRAFTING THE FIG-TREE.

The fig-tree is grafted on the mulberry and on the plane-tree; and it is grafted, not only in the spring, as other trees are, but in the summer also to the winter solstice, as Florentinus says.

LIII.—THAT THE FRUIT OF THE FIG-TREE MAY BE WHITE ON ONE SIDE, AND BLACK OR RED ON THE OTHER.

Having taken different shoots, and having first tied those that are of the same age, set them in a trench, and manure and water them; and when they shoot, tie both the eyes together again, that they may grow in one stem; and after two years transplant them, if you will, and you will

 have

[r] See Palladius, iv. 10, 31.

have figs of two colours. Some also do this more infallibly this way: having tied the seeds of two different figs together in a cloth, they set them, and they afterwards transplant them.

LIV.—THAT THE DRY FRUIT OF FIG-TREES WHICH ARE CALLED ISCHADES, MAY KEEP WITHOUT PUTRIFYING.

THE figs called Ischades[s] will keep sound, if you throw three of them into tar, and lay one at the bottom of the jar, and lay on dry figs, till it is half filled; then put in one of the figs that have been covered with tar, and again a layer of figs, until the jar is filled, and above all the third fig dipped in tar. They will also keep good a very long time, if they are suspended in a basket in the oven, after the bread is taken out, and laid in a new jar, that has not been pitched. But it is proper to gather the figs with the pedicles on which they hung, and to throw brine boiled with oil on them in the sun, and to lay them in the vessel, and to stop it with clay, and[t] to let them be

[s] Dry figs, sometimes called Carian figs.

[t] This member of the sentence appears to me as if it were misplaced. If it came in after the word *sun*, it would seem to be more in its place. If the sentence be thus arranged, the seven last words will be superflous.

be exposed to the dew one night, and to lay them in the vessel.

LV.—CONCERNING SOUR OR IMMATURE FIGS.

The immature[a] figs do not fall, if you throw a chœnix of salt on the root of the tree, and cover it with mould.

LVI.—HOW ONE MAY KEEP GREEN FIGS FRESH, AS ON THE TREES.

Figs do not remain on the trees after they are come to maturity, as other fruit, but they fall spontaneously, although nobody gathers them: but it is possible to keep them fresh, as if on the trees, in this manner. When you are going to stop the wine-casks, take a new pot, or some other vessel, that is not round, but, if you can, one that has a square bottom; then gather the figs that are rather unripe, with their pedicles, or footstalks, that is, with the part on which they hung on the tree, lay them gently in the pot, at some distance from each other, and having carefully stopped it, set it in the cask so that it may swim; then cover the cask; and these will keep as you laid them in, unless the wine turns sour.

 You

[a] Called ὀλυνθοι.

You will also keep figs fresh this way: you must take from the sides of fresh gourds, certain portions like patches[v], and excavate them; then lay one in each hole, and stop it with the patches that were taken off, and lay them in a shady place, kept at some distance from fire and smoke. But it is necessary to gather them, as it has been already observed, with their pedicles; for when whole they keep during a very long time. Some laying the figs in honey so as not to touch one another, nor the vessel, and having stopped them, let them remain. Others lay a glass carefully, or something else that is transparent, with its mouth downward, over the figs, securing them with wax, leaving no vent-hole, and they keep without withering.

LVII.—CONCERNING THE SEASON FOR PLANTING ALMONDS, AND THE CARE AND GRAFTING OF THEM.

It is better to plant almonds[w] in the autumn to the winter solstice; for it is not so practicable to plant these in the spring, because this plant shoots

very

[v] Σπληνιοις εοικοτα. Σπληνια were small pieces of cloth, on which chirurgeons used to spread their plaisters.

[w] The Greeks sometimes gave the almond the epithet Θασια, from the island of Thasos. It was sometimes called by the Romans *nux Græca*.

very early. This plant loves warm situations, and it therefore seems more adapted to islands. It is likewise proper to graft the almond in the autumn; then it commonly appears in the spring: and you ought to take the shoot of the almond that is to be inserted, not from the summit, but from the middle of the tree. Almonds are also raised from seed, and from quicksets, and from offsets or suckers. But some take a cutting from the highest part of the tree, and plant it, and they have met with great success. When we indeed raise the almond from seed, we ought to take fresh seeds, and previously to macerate them in manure made soluble with water. Some also macerate the seeds in hydromel for a night. The seed to be planted ought to be set straight, with its pointed end downward, and that which is obtuse and not* slender, upward. Some also say that the plant grows more propitiously, when some fennel giant is previously thrown into the trench.

LVIII.—WHEN YOU OUGHT TO GATHER THE ALMONDS.

When their hull is going to break, gather them; and having stripped the hull, wash them in

* Και λεπτον. The last word ought to be ληπτον.

in brine, for this makes them white and wholesome; and having dried them, lay them in the sun. But if you lay them in straw, they are easily stripped of the hull.

LIX.—TO MAKE BITTER ALMONDS SWEET.

You will make the bitter fruit sweet, if you perforate the stem of the tree a palm high in its four sides, that it may take off the sap every year until it becomes sweet. But some, acting more judiciously, dig round the tree, and throw in hogs fæces, pouring in urine also: having then laid on the mould, they water it regularly, until its sap becomes sweet. But the stem of the almond-tree, when wounded, casts its fruit. You will also make the fruit tender and sweet, which was before hard and bitter, if you open the earth around the roots, and constantly water them with warm water, before the tree blossoms.

LX.—TO MAKE ALMONDS GROW WITH CHARACTERS ON THEM.

Having skilfully cracked the almond, and having kept the kernel whole, and having opened it, inscribe what you please in the inside; and

tying

tying it again in papyrus, plant it; covering it with clay and hogs fæces, lay on the mould.

LXI.—TO MAKE THE STERIL ALMOND-TREE PRODUCE FRUIT.

But you will make the steril almond-tree produce fruit by exposing its roots in the winter: and if it indeed persists to produce leaves, but no fruit, having perforated the part[r] of the stem near the ground, drive a piece of the resinous pine into the hole, pour on some urine, and then lay on the mould.

LXII.—CONCERNING GRAFTING THE ALMOND-TREE.

The almond-tree is grafted, not on the extreme branches on the trunk, but on those branches that run up in the middle, at the end of autumn.

LXIII.—CONCERNING THE SEASON FOR PLANTING CHESNUTS.

The chesnut, which some call the glandiferous tree of Jupiter, delights in sandy land and in

cool

[r] The Greeks use ϛελεχος to express this part.

cool situations; and it is raised from quicksets and from seed, but the surer method is from plants, for they will produce fruit after two years. But it is planted from the equinox, not only from truncheons and from layers, but also from suckers and quicksets, as the olive. But chesnuts are sown, not in the same way as the almond and nuts[a], but having the pointed part upward.

LXIV.—CONCERNING THE SEASON FOR PLANTING NUTS, AND THE CARE OF THEM.

WALNUTS are planted in the same season as the almond, and they are raised from seed, and from offsets, and from suckers; and they love dry and cool situations, rather than such as are warm: but if you are going to raise the nut from seed, you will act more judiciously, if you macerate the seed in a vessel containing urine,[a] during five days, and then plant it, and the kernel and the shell of the nut will be tender: and you will make the almond the same by continually throwing ashes on the trunk and roots of the tree. The nut-tree will also grow more propitiously when

[a] Walnuts.

[a] The original is more expressive in relation to the quality of the urine. Ουρον παιδος αφθορου.

when often transplanted, and especially if one drives a copper nail, or a piece of stick, into the tree, till it reaches the pith: and if a person perforates the pith with an auger, and makes a piece of elm of th s ize of the hole, and sets it in, having thoroughly perforated the tree, he will make the nuts, that are hard and coarse, tender. The walnut-tree also does not cast its fruit, if you tie the root of mullein and a crimson rag from the dunghill round the tree.

LXV.—CONCERNING GRAFTING THE NUT-TREE.

SOME of the writers on agriculture say that the nut-tree has not been used to be grafted, nor other trees that have a resinous sap; and that they neither receive another plant, nor can they be inserted on other trees: but this is not true, as experience has often stood the test; for I have frequently grafted and inoculated pistacia-trees on the terminthus, which the people in the country call terebinthus, which has a copious flow of resin, and I had large trees: and I may say that the terminthus receives the graft of the pistacia more cordially than one of its own kind: and I have frequently inoculated and grafted nut-trees, and I have met with much success. But

But if it does not coalesce with facility, you must not therefore desist on account of the first failure. Some indeed graft the nut-tree thus: after they have sown it, and it is come to some growth, and of the age of two or three years, they take up a plant, they graft the root in the usual manner internally, and they then plant it again. Others also, having selected a shoot from the nut-tree, from which they mean to graft, the year before, turn and twist it; for the shoot being thus treated will have a fuller pith, and it will be more easily trimmed, and when it is grafted it grows strong.

LXVI.—THAT NUTS WITHOUT SHELLS BECOME PRODUCTIVE.

You will make nuts have tender shells, if having cracked the nutshell[b], and having kept the kernel unhurt, you wrap it in wool, or cover it with fresh leaves of the vine, or of the plane-tree, that the seed being naked may not be eaten by ants, and you will thus plant it. Florentinus says that it is the same with regard to the almond and

[b] Τα οςρακον. The Greeks applied this word to express the covering of the seeds of plants as well as of testaceous animals, in the same way as the English apply the word *shell*.

and other fruits, that have a hard integument, when they are planted in this manner. They assiduously throw ashes over the stem and roots of the tree.

LXVII.—THAT THE NUT OR ANY OTHER TREE MAY BE DRIED UP.

WHEN fasting, chew a fresh lentil, that is, the seeds; and after you have chewed them, while you have them in your mouth, when the nut-tree is in blossom, lay hold of any one of the branches with your teeth, and it will be dried up. Or fix a red-hot spike in the root of any tree; or perforate it with an auger, and set in a piece of the tamarisk; or, having dug round it, lay dictamnus[c] or beans, or a polluted[d] rag, on the roots of it.

LXVIII.—CONCERNING THE PONTIC NUT, CALLED THE SMALL NUT.

"THE Pontic nut is also set at the same time with the almond and the walnut; and it loves a white clay and watery situations. There is also one sort that is round, and one that is oblong; and

[c] Now sometimes called *fraxinella*.

[d] This is more accurately expressed in the Greek.

and the round one, when set in the same season with that which is oblong, shoots speedily.

LXIX.—CONCERNING MULBERRIES, AND HOW THEY BECOME WHITE.

The white poplar, being grafted or inoculated from the mulberry-tree, produces white mulberries. Mulberries keep a very long time in a glass vessel[e]. They are also planted at two seasons, in the autumn and in the spring, and principally from shoots, as fig-trees: and they grow propitiously, when the earth lying around them is constantly stirred, not deep, but to the roots near the surface. Mulberry-trees may be also raised from seed, if one first macerates the mulberry, and picks out the seeds, and sows and waters them; but it is better raised from a cutting and a truncheon. It is also grafted on the chesnut and on the beech.

LXX.—CONCERNING KEEPING AND LAYING UP MULBERRIES.

Mulberries, carefully laid in a glass vessel, keep during a very long time, when covered with their own liquor, and stopped.

LXXI.

[e] Βικος was a small jar.

LXXI.—CONCERNING THE PLANTING OF THE MEDLAR.

The medlar is planted in the same way as the quince, from the ninth[f] of the calends of April.

LXXII.—CONCERNING THE PLANTING OF THE CAROB-TREE.

The carob-trees are planted in the same manner nearly as the olive-trees, but in moist situations, from the ninth[g] of the calends of January to the fourth[h] of the calends of February.

LXXIII.—CONCERNING THE EXPLANATION OF THE NAMES OF ESCULENT FRUIT AND NUTS.

As the writers on agriculture, men of consummate experience, do not explain the names of fruit to us in common terms; but sometimes indeed make mention of a royal nut, and sometimes of a pontic nut, and sometimes of the glandiferous tree of Jupiter: I deem it necessary to explain,

[f] The 24th of March.

[g] The 24th of December.

[h] The 29th of January.

explain, which is the royal, and which the pontic nut, and the names of fruit mentioned by them. The royal nut then is that which is called by us the nut[i]; and the pontic, that is the small nut; the glandiferous tree of Jupiter is the chesnut; the coccumelon is what we call the damson; the armeniaca is the apricot; the terminthus[k] is what we call the terebinthus.

LXXIV.—CONCERNING THE DIFFERENCE BETWEEN FRUIT AND NUTS.

THAT is called fruit[l] which is of a green colour, as the duracina, apples, pears, damsons, and such as have no hard covering externally; but those are called *akrodrua*[m], which have a shell externally, as the pomegranate, the pistacia, the chesnut, and such as have fruit with a hard covering on the outside[n].

LXXV.

[i] The walnut.

[k] It is called by this name by Theophrastus, Dioscorides, Galen, and by most of the ancient authors.

[l] Οπωρα is what the Romans called *pomum*, that is, esculent fruit without a hard rind, as the ακροδρυα had.

[m] Ακροδρυον was fruit, the covering of which was a shell.

[n] To distinguish them from the olive and other fruit, the seed of which has a hard covering within the pulp or fruit.

LXXV.—CONCERNING THE TIME AND MANNER OF GRAFTING TREES.

There are three modes of grafting, and one of them is indeed properly called grafting; and the second is grafting[o] in the rind; and the third is inoculation. It is indeed proper to graft[p] the trees that have a thick bark, and that abound in sap, the bark of which draws much moisture out of the ground, as the fig and the cherry tree, and the olive plant. But it is necessary, before the grafting in the rind, to prepare a small stick from some firm wood, to let it down a little way between the bark and the wood, that the bark may remain unbroken; for it is necessary to observe this, then to remove the stick with caution, and immediately to set in the graft; and this mode is called grafting in the rind: but in trees that have a thin bark and are dry, and which have their moisture, not in the bark, but in the pith, such as the citron and the vine, and others of this kind, they divide the wood in the middle, and set in the shoots; and this mode is

 called

[o] In the Greek, ιμφυλλυσμος.

[p] The Greek expression here is, "to graft in the bark."

called grafting[q]. It is necessary in both the fore-mentioned modes to perform the operation succinctly, that neither the shoot that is applied, nor the tree that receives it, may become dry when the application is made. It is also proper to take off the shoots from generous, and full-grown, and fruitful trees, with sharp pruning-knives, from the north side, tender and smooth, with many eyes, having two or three points, but one at the bottom; let them be of the thickness of one's little finger; and let them be two years old, for those that are one year old are indeed apt to run up, but they are steril. It is proper to trim the shoots with a sharp knife on one side at the bottom, as you do a writing pen, observing that there may be no diminution of the pith. It is also proper to form the shoot so that the woody part may be adapted to the wood, and the bark to the bark. Let the shoot be also trimmed of a proper size for the fissure, and for the place[r] that is prepared, in which it is to be set. Let it then be trimmed to the distance of two inches, and let the plant that receives it be slit two inches deep:

[q] Now called cleft-grafting.

[r] Και τω κοιλωματι, "and for the hollow place." It means the place which was prepared to receive the shoot.

deep: and after it is set in, no part of the shoot is to be taken off, but it is to be left as it is; and it is necessary to cover the place with white clay that does not crack, for the yellow clay is unfit for this, for it scorches the stems. The mode of grafting is also so far useful that, if a person graft the plants on their own kind, they thrive and improve. But it is necessary to select the shoots when the moon is in decreasing, ten days or more before the grafting, and to lay them in a vessel carefully covered, that no air may be let in; for the shoots indeed that are selected must be kept close, but the tree that is grafted must be ready to bud; it is therefore necessary to select the shoots ten days before, or more. Now know the reason why it is not proper immediately to take the shoots and to graft them; for if a shoot is immediately set on the tree, that receives it in full vigour and swoln, there is an urgent* necessity, before an union takes place, that the shoots should wither a little; and that thence arises an opening between the shoot that is set on, and the wood that receives it; and the air moreover entering into the vacant place, does not suffer a coalition to take place. But if the shoots are first laid in some vessel during some days,

 they

* Every necessity, in the Greek.

they remain there to go through what they were to go through after grafting; and when they are applied there is no laxity of the bandages, nor does the air get in, but they soon coalesce. But it is necessary to fix the shoots, not when the north but when the south wind blows. This is also evident, that showers are propitious to cleft-grafting, but unpropitious to shoulder-grafting. It is likewise proper to know that grafting is practised after the autumnal equinox to the winter solstice, and after the blowing of Favonius, that is, from the seventh of the month of February to the vernal equinox. But some say that the best season for grafting is immediately after the rising of the Dog-star, and again in the summer after the burning heat of the Dog-star. If the shoots are conveyed from a distance, let them be brought fixed in clay, and let the vessel be carefully stopped, that there may be no vent.

LXXVI. — CONCERNING GRAFTING IN THE RIND, CLEFT-GRAFTING; AND WHAT SORTS OF TREES ARE CAPABLE OF GRAFTING IN THE RIND, AND OF CLEFT-GRAFTING.

The fig is inserted on the mulberry and on the plane tree. The mulberry is inserted on the chesnut,

chesnut, and on the beech, and on the apple-tree, and on the terminthus, and on the wild pear, and on the elm, and on the white poplar, from which white mulberries are produced. But the pear is inserted on the pomegranate, and on the quince, and on the mulberry, and on the almond, and on the terminthus: and if a person inserts the pear on the mulberry, he will have the fruit of a red colour. Apples are grafted on every kind of wild pear, and on the quince, and they become the best sorts, which are called the sweet apples at Athens; and on the damson also, and *vice versâ*, and on the plane-tree, from which the apples grow red. The walnut is grafted on the arbutus only. Pomegranates are inserted on the willow. The bay is grafted on the ash[t]. The duracinum is inserted on the damson and on the almond. The damson is grafted on all sorts of wild pears, and on the quince, and on the apple-tree. The chesnut is grafted on the nut-tree, and on the oak, and on the beech. The cherry is grafted on the terminthus, and on the peach, and in reversed order. The quince is grafted on the oxyacanthus. The myrtle is inserted on the willow. The apricot is inserted on the damson

 and

[t] Some think this ought to be εις μηλεαν instead of εις μελιαν, *i. e.* on the apple.

and on the almond. The citron having so thin a rind, hardly receives a graft: but it is grafted from its own kind, and from the apple, which I have frequently done, and after it shot, it withered; but I think, if it takes, it will produce the citrons called the apple-citrons; and if any person inserts the citron on the mulberry, it will produce red citrons. The quince and the wild fig receive all kinds; therefore graft or insert what you please on these. The citron is properly grafted on the pomegranate, as Didymus says in his Georgics. But Florentinus says in his Georgics, that the vine is properly grafted on the cherry[a], and that it produces grapes in the spring; and that the olive grafted on the vine produces the fruit called the olive grape. The sweet-scented pears are properly grafted on apple-trees, as I have learned from experience.

LXXVII. — CONCERNING THE SEASON AND MODE OF INOCULATING.

Inoculation is seasonably practised before the summer solstice. I have indeed inoculated about the vernal equinox in fine weather, when the

[a] See book iv. c. 5.

the trees were beginning to shoot, and I succeeded very well. But you are to clear the tree that is inoculated from its superfluous parts, that is, from suckers and leaves, having left the more perfect and strongest branches, which are to be budded; then taking a generous bud, that is one year old, from a tree that bears well, you are to set the eye from it with the utmost exactness on the other trunk: and it is proper to take off the bark with precision, and to keep the wood whole and untouched, for this is absolutely necessary. It is also proper that the eye in the bud should fall on the eye in the stem; for when set on it, it totally coalesces. But one may inoculate, and without an eye, on another part of the stem, in a smooth place; but it is necessary that the barks of each stem should be of equal thickness: and when an union takes place, immediately cut off what is above the juncture, that the nourishment may not get into that part, but to that which is compacted; and when the buds produce three leaves, it is proper to remove the bandages. I indeed have often taken off the eye from a germ a year old, and have not grafted it by itself; but having left the eye unhurt in the germ, and having taken off the bark from the part behind the eye, and having scraped some

portion

portion of the wood, as we do in making a pen[v], and having thus grafted with the remaining part of the wood, I have raised generous trees from this mode of insertion. The choicest parts of the branches being inoculated, will produce double the fruit.

LXXVIII.—WHEN IT IS NECESSARY TO DRESS THE TREES.

AFTER gathering the fruit you are immediately to dress the great and small trees, such as produce esculent[w] fruit, and such as produce nuts, taking off every thing that is faulty and superfluous, with very sharp knives; and you are to leave but one shoot on young plants; and you are to take off the suckers from the stem, that the plant may be smooth and straight, having three or four young shoots at the top, spreading from each other; and thus the plant is formed, while it is tender.

[v] Ως επι γραφικου καλαμου. This was made of a reed in earlier ages, and it was afterwards made of a quill; and in reference to this, it is in modern languages called, from the Latin, *a pen*, *penna*, *une plume*, *pluma*, &c. The writing reed of the Greeks was called συριγγιας.

[w] Την οπωραν.

LXXIX.—FOR SIDERATED TREES.

SIDERATED trees being irrigated with unguent[x] will revive.

LXXX.—THAT WINGED CREATURES MAY NOT FALL UPON TREES.

RUB the knife with which you prune, with garlic, or hang some garlic on the tree.

LXXXI.—CONCERNING THE CARE OF PLANTS.

YOU are to leave the plants which are set in the autumn, till the spring, without disturbing them; but when the spring comes, it is proper to dig them four[y] times: and it is necessary to dig those that are set in the spring, when they seem to have taken root, and to do the same thing with regard to those that are transplanted. It is also proper to water the plants during the summer the first year; and you are to remove superfluous shoots, not with a knife, but with your hands, if they are tender, and easily give way;

but

[x] Book v. c. 36.

[y] See Theophrastus, c. P. 3, 14.

but if not, it is better to leave them, than to apply the knife while the plants are yet young; for they become stunned by the touch of the knife. It is also necessary to fix poles for the support of the plants. It is moreover proper to manure the fruit-bearing trees in the month of January, not immediately on the roots, for it heats them immoderately.

LXXXII.—THAT ALL TREES MAY BEAR MORE FRUIT.

HAVING well pounded and mixed purslane and spurge, smear the stems: and all trees will produce more fruit, if you apply pigeons dung to the roots of them.

LXXXIII.—TO MAKE A BARREN TREE BEAR FRUIT.

HAVING[a] girt and tucked up your clothes, and having taken an axe or a hatchet, approach the

[a] This opinion relating to the fructification of trees is of remote antiquity, which came from the east, and to which the parable of the fig-tree seems to bear some analogy—*Luke*, xiii. 6. There is a passage in an Arabic writer, which shews that it was not unknown in the east. It relates to the fructification of the palm-tree, and runs thus: " The master, armed

the tree with resentment, wishing to cut it down: but when any body comes to you, and deprecates the cutting of it, as if responsible for a future crop, seem to be persuaded, and to spare the tree, and it will bear fruit well in future. Bean haulm also, applied to the stem, makes a tree bear fruit.

LXXXIV.—CURE FOR TREES, HEALING EVERY BLEMISH.

Some peculiar remedy is indeed exclusively suitable to every tree. Now I will not omit a cure, that is applicable to all trees in general, but will make it public. If you then wish all your trees to remain healthy and to thrive, having dug round them, irrigate their roots and stems with the stale urine of man or beast; and if showers fail, water them. Amurca, mixed with an equal quantity of water and poured over every tree, has the same effect. Some, when they plant trees, rub their

" with an axe, approaching the tree with an attendant, says, " I will cut down this tree, because it bears no fruit. Abstain, I pray, says the other; it will produce fruit this " year. The master indeed without delay strikes it, but with " the axe inverted: but the other preventing him, says, " Spare it, I pray; I am responsible for it. Then the tree " becomes fruitful."—*Ibn Alvard.*

their roots with bull's gall, and such as are thus planted remain unhurt. But some, rubbing the stems of the plants with the juice of the herb called *polypremnos*[a], have kept them unhurt, and have received much fruit. But in general, bean haulm, or the haulm of pulse, or wheat straw, applied to trees, will be of service to them, as Didymus says in his Georgics.

LXXXV.—HOW ONE MAY TRANSPLANT LARGE AND FRUITFUL TREES.

HAVING made the trenches very deep, and having stripped the leaves, and having kept the thicker branches unhurt, and the roots whole, they set the stems straight, with a great quantity of their own soil, and with manure, observing that they may remain in their primary aspect: and they set two perforated vessels at the sides, that they may constantly water the roots by means of the vessels; and they set on their covers, without stopping the holes. They are also seasonably transplanted before the setting[b] of the Pleiades. But it is necessary, in the planting of the

[a] Sometimes called *Lactuca agnina*; Tabernæmont, i. 18 and 19.

[b] About the beginning of November.

the tree, to observe the original aspect to the east and west.

LXXXVI. — HOW ONE MAY RAISE PLANTS FROM SEEDS BROUGHT FROM A DISTANCE.

SINCE plants brought from a distance often wither, it is necessary thus to remove those from seeds. When the[e] fruit has ripened on the stem, they take and besprinkle it with dust; they then dry it in the shade, and they afterwards make a trench and set the fruit, and they water it daily, until it shoots; and when it is two or three years old, they transplant it with its roots, and they set it, leaving the tops of the plants only above the soil. The planting of seeds indeed seems to some to be frivolous. But it is proper to know, that every seed produces its own kind, excepting the seed of the olive; for it produces the *cotinus*, that is, the wild, and not the true olive.

LXXXVII. — THAT TREES MAY NOT CAST THEIR FRUIT.

WHAT is called darnel, found among wheat, being taken up in abundant quantity with its roots

[e] Ο καρπος seems here to signify the seed and the fruit.

roots from the ground, when it begins to flourish, and being formed in the shape of a chaplet, if it is thrown round the stem of the tree, brings its fruit to perfection, and it does not cast it. The herb also called mullein, bound round the nut-tree, will not suffer it to cast its fruit; and it does not cast its fruit, if a crab is tied round it. If you likewise bind the stem with lead as with a chaplet, it does not cast its fruit, but it will bring it to perfection. Plants do not cast their fruit, if having dug round the roots, and having perforated them, you set in a piece of the cherry-tree, and lay on the mould. But some, having laid the roots bare, dividing the strongest and largest of them in the middle, set in a hard flint, and then tying them, they again cover them with earth; and Didymus says in his Georgics that this verse of Homer contributes to this:

He[d] thirteen months in hard confinement lay.

A stone also, with a hole in it, being found and set on a branch of the tree, likewise retains the fruit, if you inscribe these words on it, and tie it in a proper manner to the tree: " And it shall be like a tree planted by running water, which will produce its fruit in season, and its leaf will not fall

[d] Ilias, liv. v. v. 387.

fall. The herb *polium*[e] being hung on the tree, keeps on the fruit.

LXXXVIII.—CONCERNING THE CURE OF TREES THAT CAST THEIR BLOSSOMS, OR THE LEAVES OF WHICH FALL OFF.

WHAT trees soever shed their leaves, or cast their blossoms, are thus cured. Having dug round the roots, lay on the measure of eight[f] congii of bean haulm mixed with water to a large tree, and to a small one not less than two congii; for thus such as are unhealthy will be cured, and the others will remain free from disease.

LXXXIX.—THAT PLANTS AND SEEDS MAY NOT BE HURT BY CATTLE OR OTHER BEASTS.

THROW[g] river or sea crabs, not less than ten, into water, and let them remain eight days; and having covered them, lay them in the open air, that they may be insolated during ten days, and

[e] In English called *poley*.

[f] Χοαν οκτω.

[g] This prescription is mentioned by Palladius, lib. i. c. 35.

pour the water on such as you may wish not to be hurt for eight days, and you will wonder at its efficacy. Canine fæces, mixed with very stale urine and applied[h], have the same effect.

XC.—THAT NEITHER TREES NOR VINES MAY BE HURT BY WORMS, NOR BY ANY OTHER ANIMAL.

HAVING pounded Lemnian sinople and origanum with water, apply it to the roots, and plant squills round them: and if you fix perches of the pine[i] round the trees, the worms will be destroyed. If hogs fæces, diluted with the stale of an ass, are applied, this keeps the tree unhurt from worms, as Didymus says in his Georgics: and he says that if you apply bulls gall to the roots, the tree neither soon decays, nor will it produce worms. Trees will not be worm-eaten, if, having laid the roots bare, you apply pigeons dung to them all around.

[h] Besprinkled, in the Greek.

[i] Probably, the resinous pine from which tar was extracted.

BOOK XI.

HYPOTHESIS.

These things are contained in this Book, being indeed the Eleventh concerning the select Precepts of Agriculture; and comprising the trees[k] for chaplets, and the evergreen trees, and the planting of roses and lilies and violets, and of other sweet-scented flowers.

I.—WHAT TREES ARE EVERGREEN, AND DO NOT SHED THEIR LEAVES IN WINTER.

THE evergreen trees that do not shed their leaves in the winter are fourteen; the palm, the citron, the strobilus, the bay, the olive, the cypress, the carob, the pine, the ilex, the box, the myrtle, the cedar, the willow[l], and the juniper.

[k] Some of the Greek writers say these were roses, myrtles, and bays.

[l] Ἰτέα. Some have supposed that this ought to be written ἐλάτη, the fir-tree.

II.—CONCERNING THE BAY-TREE.

DAPHNE was a most beautiful daughter of the river Ladon[m]; and Apollo being smitten with her, pursued her as his beloved object. When she was therefore apprehended by the god, they say that she supplicated her mother Earth, and that she was received by her; and when the Earth produced a tree for her, Apollo was struck with astonishment at the sight of it, and he called the tree Daphne, after the name of the virgin: and taking a sprig of it, he crowned himself with it; and from that time the plant became a symbol of divination. They also call the damsel Sophrosune, and this is not improper, for divination proceeds from chastity, and the ancients consecrate this to Apollo, because the plant is of a hot[n] nature, and Apollo is fire, for he is the same as the sun; whence it is hated by demons, and where there is a bay-tree demons betake themselves to flight. They also who burn this when performing acts of divination, seem to find the aid

[m] A river of Greece, of which Philostratus and Aphthonius feign Daphne to be the daughter. Callimachus says it was a large river. Hymn 1. 18.

[n] Eusebius *de præpar. Evang.* says that the bay was dedicated to Apollo, because it was of a fiery nature.

aid of prediction. They also say this with regard to the bay, that it contributes to health; whence its leaves and dried figs were given to the magistrates by the people on the first[o] day of the month of January. Neither does the epilepsy, nor a demon, infest the place where the bay-tree is; nor does thunder approach the place where it stands. A palace has also been called *Daphne*, derived from the name of the bay-tree[p] at Rome; for they say that Latinus, the brother indeed of Telegonus, and the son of Circe, and the father-in-law of Æneas, when building the citadel before the arrival of Æneas, found a bay-tree there. The ancients also called the palaces of kings, citadels[q], as they were for the sake of security built in the most elevated parts of cities.

III.—CONCERNING THE GRAFTING OF THE BAY, AND THE SOWING AND TRANSPLANTING OF IT.

QUINTILIUS says that bay-trees are grafted on each other, and on the service, and on ash-trees. But

[o] Macrobius says, that the old bays were changed for fresh ones the beginning of March, in the houses of the high priests called Flamines, s. i. 12. This seems to have been done before January and February were added to the calendar.

[p] See Æneid. lib. vii, v. 59, &c.

[q] Ακροπολεις.

But Diophanes says that the seed of the bay-tree is gathered about the calends of December, and it is sown after the ides of March; and the plant is removed and transplanted in October. The Romans also call this the plant of good genius, and it is well[r] adapted for hedges of vineyards.

IV.—CONCERNING THE CYPRESS.

THE cypresses have two names, and they are indeed called *charites* on account of their delectable quality, and cypresses, on account of their bearing and producing branches and seed in such regular order. They were the daughters[s] of Eteocles; and when dancing in imitation of the goddesses, they fell into a well; and the Earth, commiserating their misfortune, produced flourishing plants like the damsels, forming them for the delight of men, and for perpetuating their[t] memory.

[r] Some of the ancient writers have said that it is injurious to the vine. Theophrastus, iv. 20. Pliny, xiv. 24.

[s] There are several accounts of their origin. Ovid. Metam. l. 10. v. 106. Pliny, xvi. 33, &c.

[t] The word refers to the damsels.

V.—CONCERNING THE PLANTING OF THE CYPRESS.

The seed of the cypress is indeed gathered after the calends of September, and it[a] is sown in beds from the ninth of the calends of November throughout the winter: and after the sowing of the cypresses, sow some barley thin (and the cypresses frequently grow to a considerable height the same year, for they grow as much as the barley); and transplant them. The shoots also growing spontaneously, which arise from the cypress, are transplanted in the same manner. But Democritus says that the cypress ought to be planted within a hedge, that it may grow both for pleasure and as a fence. It loves wet and sheltered situations. The male[v] cypress is steril.

VI.—CONCERNING THE MYRTLE.

Myrsine was an Attic maid, surpassing indeed all the damsels in beauty, and all the young men in strength; and she was acceptable to the goddess Minerva; and she exerted herself in the palæstra,

[a] Cato says it was sown in the beginning of the spring, c. xlviii. 1.

[v] See Pliny, xvii. 10.

palæstra, and in the race; and she crowned warriors and conquerors: but some of those that were overcome, being enraged at the maid, murdered her from envy: they did not indeed extinguish Minerva's affection for her, but the myrtle remains grateful to the goddess as well as the olive, although[w], having changed its mode of life, it bears myrtle-berries instead of olives.

VII.—CONCERNING THE PLANTING OF THE MYRTLE.

It is proper to plant the myrtle in all the most elevated parts of the country, for it produces much grateful smell in the place. Some indeed propagate it from suckers, taking the plants that have roots: others also take a very generous shoot from the top of the tree, and set it straight, throwing some good soil with manure on it; and they heap on the mould up to the shoots that have arisen from it. Some likewise set truncheons of the length of a cubit, and[x] of considerable thickness, in the trenches; and they cover them with

[w] The sense of this passage seems to be this: "The myrtle is not less acceptable to Minerva than the olive-tree, although it does not produce olives, but myrtle-berries.

[x] "Of the thickness of one's hand," in the Greek

with earth, when laid in an oblique[y] position, in the same manner as the olive. Some also having rubbed a rope, made of butomus[z], with the seed fresh-gathered, set it in a trench. But some think that they bear better if they are planted in an inverted position. It also loves to be assiduously pruned; and it thus runs up straight and high, and it grows fit for basket work and for darts: but you are to water it with urine, and especially with sheep stale, for it loves this immoderately. It also produces good[a] fruit when irrigated with warm water. It is grafted on its own kind, on the white and the black sort, and *vice versâ*; and on the wild pear, and on the apple-tree, and on the medlar, and on the pomegranate: and if roses are planted near it, both will flourish, and they[b] will produce very generous seed.

VIII.—CONCERNING THE KEEPING OF THE MYRTLE-BERRIES.

Having laid the berries in vessels that are not pitched, and having stopped them, you will keep

[y] See book v. c. 9.

[z] Water gladiole, book ii. c. 6.

[a] "Fruit without kernels," in the Greek.

[b] Ευγενεστατον οισουσι καρπον.

keep them green during a long time: but some lay them up with their branches.

IX.—CONCERNING THE BOX-TREE.

The box is planted from layers, and from cuttings, and from slips, set in the nursery after the ides[c] of November; but being an evergreen, it likes moist situations.

X.—CONCERNING THE PINE.

The pine, being at first a maiden, was changed from a double affection. For Pan[d] indeed loved the damsel, and Boreas also loved her; and each of them urging his suit, the girl's affection was fixed on Pan; and Boreas became jealous on this account, and having driven the damsel on rocks[e], consigned her to destruction: but the Earth, pitying her misfortune, produced a plant of the same name as the damsel; and she having changed her existence, continues her affection as at first; and

[c] The 13th of November.

[d] *Arcadio Pinus amata Deo.*—Propert. i. 18, 20.

[e] This seems to allude to shipwreck.

and she indeed crowns Pan with her branches, but the tree laments when Boreas blows on[f] it.

XI.—CONCERNING THE PLANTING OF THE PINE[g].

The cones are planted in the same manner as almonds, in the month of October till January; but they are gathered in June before the *etesiæ*[h] begin to blow, and the grains to fall, when the integument bursts.

XII.—CONCERNING THE LENTISC.

The lentisc indeed likes wet situations. and it is planted from the calends of January: but they say that it produces seeds three[i] times; and if the first seed is good, it indicates that the first sowing will succeed well; and it is the same with regard to the others.

XIII.

[f] Towards it, in the Greek.

[g] Πίτυς was that species of pine which produced tar.

[h] Called by the Romans *venti subsolani*. The Greeks gave them this appellation on account of their returning at stated periods; Gellius, ii. 22.

[i] See Cicero de Divinat. l. i. c. 9. Arati Διοσημ. v. 319.

XIII.—CONCERNING THE WILLOW.

The willow likes a miry and watery soil, and a moist and cool air; and it is planted in the month of February from truncheons and cuttings. But Democritus says how the seed of the willow, when ground and mixed with the provender of cattle, makes them fat; and when drunk after it has been pounded, it makes the human race steril; from which circumstance Homer[k] says,

"Of the abortive kind have been these three,
The alder, poplar[l], and the willow-tree."

XIV.—CONCERNING THE ILEX.

It is necessary to plant the ilex[m] before the calends of March. They also say that the ilex, if it produces much fruit, portends plenty.

XV.

[k] Pliny says that is called ὠλεσικαρπος by Homer, because it sheds its seed very early before it comes to maturity, lib. xvi. 26. With regard to the other opinion, see Eustathius, Σλ. λ. 834.

[l] Black poplar.

[m] Matthiolus mentions two species, the ilex and the *ilex latifolia spinosa.* The *coccifera* produced the kermes or scarlet grain of the ancients. The acorn of the ilex is called ἄκυλος by Aratus. Matth. i. 10, 11. and iv. 43.

XV.—CONCERNING THE DENDROLIBANUS.

Libanus[a] is a Syrian name, when applied to the mountain and to the plant[o]: for there was a youth who served the gods; wherefore wicked men, moved by jealousy, put him to death: but the Earth, honouring the gods, produced a plant of the same name as the youth who fell; and although he changed his nature, he is not destitute of affection towards the gods; whence a person proves more acceptable to them by offering frankincense than gold.

XVI.—CONCERNING THE PLANTING OF THE DENDROLIBANUS.

They say that the dendrolibanus is planted from roots and suckers, set in the ground and transplanted.

[a] The name comes from the oriental word לבך, when applied to the mountain, because it is in the language of Tacitus *nivibus semper fidus.* When applied to the plant, it is by the Arabs called لُبَانْ, which is strictly the frankincense, which comes from it.

[o] Dendrolibanus in this place means rosemary, because its leaves have a smell like frankincense; Pliny, xxiv. 11.

transplanted. It has a sweet[p] and a strong smell, as Democritus says; and it is of service to persons who labour under a depression of spirits; and it is planted in the month of March.

XVII.—CONCERNING THE ROSE.

LET him that admires the beauty of the rose, reflect on the wound of Venus, they say; for the goddess indeed loved Adonis, and Mars on the other hand loved her: but Mars in a fit of jealousy killed[q] Adonis, thinking that the death of Adonis would put an end to her affection for him; but the goddess, having understood what had been done, hastened to be revenged; and throwing herself in a hurry on the rose, when without her sandals, she was wounded by the thorns of the rose in the sole of her foot; and the rose, which was before white, from the blood of Venus, changed into the colour in which it is now seen, and it became red and sweet-scented. But others say that, when the gods were feasting above, and there stood a great quantity of nectar, Cupid

[p] See Diosc. iii. 89; Pliny, xxi. 10, and xxv. 9.

[q] It is said that he was turned into a boar; Dionys. lib. xli. p. 1064. Wech.

Cupid led the dance, and with his wing struck* the bottom of the bowl and overturned it, and that the nectar poured on the ground made the rose of a red colour.

XVIII.—CONCERNING ROSES; AND HOW ONE MAY MAKE THEM MORE SWEET-SCENTED, AND HOW ONE MAY ALWAYS HAVE THEM.

If you plant garlic among roses, they will be more sweet-scented; and if you wish to have a constant supply of roses, plant them monthly, and dung them, and you will have them all the year. But roses are planted various ways; for some transplant such as have taken perfect root; and some take them up with their roots, and cut them to the length of a palm, that is, of four fingers breadth, the roots and what is shot from them, and they plant all the cuttings at the distance of a cubit from each other. Some, forming them into chaplets, plant them for their fragrance. But it is proper to know that roses planted in dry situations, as well as lilies, will be of a more pleasant smell. Roses also come early, when planted in baskets and jars, and having the same attention shewn them as gourds and cucumbers.

If

* Shook, in the Greek.

If you likewise wish those that are already planted to produce early flowers, dig a trench at the distance of two palms from the plant, and pour in warm water twice a day. The dew which is found on roses, when gathered clean with a feather, and applied with a specillum[s], cures the ophthalmia[t]. You will preserve roses fresh and flourishing, if you lay them in amurca, so that the liquor may cover them. Some pluck up green barley with the roots, and put it in a jar that is not pitched, and laying on the roses, close cover and preserve them; but some, having strewn green barley on the pavement, scatter the roses on it. Democritus says, that the rose-tree, when watered twice a day in the middle of the summer, produces flowers in the month of January. Florentinus also says, that the rose may be grafted in the bark of the apple-tree, and that the roses grow in the apple season. Zoroastres says, that a person will have no complaint in his eyes during twelve months, who finding[u] the empalements of the flower on the plant, before they expand,

[s] Μηλη, an instrument for dilating the natural passages and cavities, called a probe. It is said to have been invented by Æsculapius.

[t] Inflammation of the membranes which invest the eye.

[u] Seeing, in the Greek.

expand; and rubbing his eyes with three of them, saves the roses on the plant. Some also keep roses fresh by slitting a green reed that is planted, and setting in the buds, and tying them carefully with papyrus, so that they may have no vent. Suffumigate roses with sulphur when they begin to open, and you will instantly make them white. If you wish from a few plants to make more, take and divide the shoots, and make them of the length of four fingers breadth, or a little less, and set them; and when they are a year old transplant them, a foot distant from each other, and so cultivate them, digging them carefully, and removing all the useless wood. I am really persuaded that the rose partakes of something more than what is human, for it makes an unguent of no inferior kind; and it is no indifferent remedy for complaints of the eyes.

XIX.—CONCERNING THE LILY.

WHEN Jupiter had Hercules by Alcmena, who[v] was mortal, he wished to make him partaker of immortality; and he laid him to Juno's breast, when she was asleep, while he was in the state of infancy; and the infant being satisfied with milk,

[v] Refers to Hercules.

turned away from the breast, but the milk still flowed copiously when the infant was removed; and what was diffused in the sky made what is called the milky-way[w]; and what flowed on the earth and tinged its surface, produced the lily, which is like milk in respect of colour.

XX.—CONCERNING LILIES.

If you wish to make lilies of a purple colour, take the stems when they blow, tie ten or twelve of them together, and hang them in the smoke, for they produce small roots like bulbs from the stems. When the time of planting comes, macerate the stems in lees of old wine, until they appear of a purple colour and well tinged to you, when you take them; then plant them, pouring a sufficient quantity of the lees on each of them, and thus the flowers produced from them will be of a purple colour. Lilies will also keep fresh during all the year this way: they gather them with their pedicles, not yet opened, but while they are close; and they lay them in new earthen vessels, that are not pitched; they then stop the [illegible] vessels

[w] Other writers mention this; Eratosthenes, *cap. ult.* Manilius, lib. i. Achilles Tatius, p. 146; Euseb. Præp. Ev. lib. ii. p. 55, &c.

vessels and lay them by, and when thus prepared they will keep fresh all the year. But if persons wish in the mean time to take them for use, they set them in the sun, that they may be opened when warmed. That lilies may also blow at different periods, when you plant the bulbs, set some twelve, some eight, and some four fingers deep, and you will have lilies during a long time. One may also do this with regard to other flowers. Florentinus says the lily grows red if a person pours cinnabar between the coats of the bulbs, observing that he may not bruise them: and if a person rubs them with any other colour, to which he may be partial, he may raise lilies of any hue.

XXI.—CONCERNING THE IRIS.

A SHORT and very small portion of the Illyrian* iris is set from fresh plants in January to the month of April.

XXII.—CONCERNING THE VIOLET.

THE violet sprung from her from whom it has its name. For Jupiter indeed loved Io, and in

 a fit

* Called Florentine iris, and sometimes orris. This is in modern times brought into England from Italy.

a fit of love lay with her, and he endeavoured to conceal the crime from Juno, and he changed her nature; for Jupiter being caught, and wishing to keep what was done secret, changed the woman into a cow. But the Earth, honouring her who was beloved by Jupiter, produced a flower for the use of the cow; and being raised on her account, it is named from her; and it exhibits the fortune of the damsel by its colours: for it indeed blushes[y] like the virgin, and it reddens like the cow; and it grows of a white colour, indicating the translation of the damsel to the sky[z]; and what colour soever it exhibits, the woman has been of the same.

XXIII.—CONCERNING THE PLANTING OF VIOLETS.

PURPLE violets, and all the others, the yellow, and those of a russet colour, are planted after the ides of March, and after the calends of May. But the leaf of the violet is refreshing, and it relieves in cases of inflammation; and the oil of violets,

[y] That species of the violet called pansy, is here supposed to exhibit the different colours.

[z] To the stars, in the original.

leaves, applied[a] in fevers, abates them. The white violet is also raised in the same manner in beds, and it is transplanted in January to the seventh of the ides of February.

XXIV.—CONCERNING NARCISSUS.

The cause of an uncommon misfortune has been still more uncommon; for Narcissus was enamoured with himself, and on this account he perished. He indeed excelled in comeliness of person, and hence arose his affection and desire; for he betakes himself to a fountain to drink, and remaining an attentive observer of his own figure, he became the lover, and the object of his love; but being captivated with himself, he perished. Coming therefore to the fountain, he fell in love with his shadow, as if beloved; but being overcome, and catching at himself, he plunged into the water in the fountain; and seeking relief to his passion, he was deprived of his life; being so far a gainer by this fatal end, that he was changed into a memorable flower of the same name.

[a] Rubbed in, according to the Greek.

XXV.—CONCERNING PLANTING THE NARCISSUS.

The narcissus is raised from roots; it begins to shoot in the month of May, and it is transplanted. Its[b] flower is very cold.

XXVI.—CONCERNING THE PLANTING OF THE CROCUS.

The crocus is raised from roots when it has rid itself of its blossom. It produces its flower before the leaf: and the flower is gathered when it is of a good colour, the apices[c] being taken from the middle of the flower, and dried during three or four days; then the extremity of it is trimmed, and the white is taken off; and it is laid in earthen vessels as close as may be. But Diophanes says that it is proper to dry the crocus in the shade.

XXVII.

[b] This looks as if it alluded to the cold habit of Narcissus, who did not look up to a proper object for his affection.

[c] They were what are now called *antheræ*.

XXVII.—CONCERNING SAMPSUCHUM, COSTUS, AND BALSAM.

The sampsuchum[d] is raised from seed, and it is transplanted in April and May: it has a very sweet smell, and it is very hot. Costus[e] likewise, and balsamum[f], are raised from roots, in the month of November: they both have a sweet smell.

XXVIII.—CONCERNING MISODOULOS OR BASIL.

Basil, that is, what is called *misodoulos*[g], is good for no use, as far as I know; for it makes them that eat it as if they were insane, and lethargic, and hepatic[h]: and it is a sign of its malignity, that the goat eats all things, and that it only abstains from basil. This, when masti-

[d] Sometimes called *amaracus*; Matth. iii. 40.

[e] The Arabian costus has a root like that of ginger; Matthiolus, i. 15.

[f] See Matthiolus, i. 18.

[g] The hate of servants. Some have imagined the plant acquired this appellation, because it put servants in mind of the execrations of their angry masters; for Pliny says, *cum maledictis ac probris serendum præcipiunt*, lib. xix. 7.

[h] The ancients, I believe, confined the term to persons who laboured under an inflammation of the liver.

cated and laid in the sun, produces scorpions[i]. But it is most consummately inimical to women, having a natural antipathy to them; so that if a person lays basil with the whole of its roots under a dish of meat[k], a woman being not acquainted with it, she dares not touch it before the basil is removed.

XXIX.—CONCERNING IVY.

Kittos was originally a youth, a Bacchanalian dancer; and dancing before the god[l], he fell down to the earth: and the Earth, honouring Bacchus, produced a plant of the same name, preserving some traits of the youth; for when it comes out of the ground, it intwines the vine, and it is braced in the same manner as[m] when the youth danced.

XXX.—CONCERNING THE PLANTING OF IVY.

Ivy loves water; and it is planted before the calends of November, and from the calends of March:

[i] Dioscorides and Pliny make the same observation.

[k] Οψȣ. The term signifies every thing eaten with bread.

[l] Bacchus.

[m] Alluding to the youth's embracing Bacchus.

March: and the ivy will produce handsome corymbi[n], if a person burns three shells, and pounds and sprinkles them over it, or if he irrigates the corymbi with alum water. It also grows white from black, when white earth is macerated and poured on the roots of the ivy during eight days. Damogeron also says, if a person puts three corymbi of black ivy in clean linen, and having tied, binds them on one who has the splenitis[o], during three days, it will relieve the the patient thus bound from his disease.

[n] The berries, when formed into round bunches, are thus called.

[o] Disease of the spleen, which last word is by Hippocrates called the left liver.

BOOK

BOOK XII.

HYPOTHESIS.

These things are in this Book, being indeed the Twelfth concerning the select Precepts of Agriculture, and comprising the sowing of different esculent plants, and such as are to be planted and sown in every month, and an admirable method of laying out a garden, and the useful effects of esculent plants.

I.—INSTRUCTION RELATING TO WHAT IS SOWN AND PLANTED EVERY MONTH, ACCORDING TO THE CLIMATE OF CONSTANTINOPLE.

IN the month of January is sown the sea[p] cabbage, with orach[q], and fenugreek.

In the month of February is sown Macedonian parsley, with leeks and onions, the beet, the carrot, the large-rooted beet, thymbra, the different kinds of lettuces; that is, the dicardium, that

[p] See Matthiolus, l. ii. c. 115.

[q] Matthiol. l. ii. c. 112.

that called phrygiaticum, and the rhigitanum, and the white cabbage, and the crambasparagus, and coriander, and anethum, and rue. The lettuce is also transplanted, the picris[r], the thridax[s], the phrygiaticum, the polyclonum[t], and the comodianum.

In the month of March are sown the beet, the cattadium[u], and orach, and the dicardium, and the rhigitanum. The lettuce is also transplanted, the picris, the phrygiaticum, and the polyclonum.

In the month of April, towards the end of it, are sown, seutlomolochum[v], and orach, and the dicardium, with the rhigitanum. In the months of March and April also are transplanted, the white cabbage, and the crambasparagus, and the sea cabbage, and the lettuce, with the rhigitanum.

In the month of May are sown seutlomolochum and orach, and mint is also propagated; and the

rhigitanum,

[r] This has been supposed to be a species of succory.

[s] This is the common Greek name for a lettuce.

[t] So called, probably, from its numerous shoots.

[u] Some have supposed this to be endive.

[v] Supposed by some to be spinach. Bodæus, p. 778; and Dodonæus, p. 608.

rhigitanum, and seutlomolochum, and lettuce, are transplanted.

In the month of June seutlomolochum is sown, and the dicardium also; and the small leek being covered with clay, is transplanted into a moist place; and beet, and mallows, and the lettuce.

In the month of July are sown succory and seutlomolochum; and the leek is set in dry ground, but it is necessary immediately to water it (that the root may not become hard), otherwise it will wither. It is also necessary to transplant the lettuce, and succory, and seutlomolochum; and the beet, and mallows, are separately transplanted.

In the month of August succory is sown, and seutlomolochum; and the round-headed and the early turnip, and the turnip that is used for asparagus, and the white cabbage; and the leek is transplanted. Succory, seutlomolochum, and radishes, are sown thin; and the rocket, and the cardamon*, are sown.

In the month of September are sown seutlomolochum and the late succory, and the wild turnip; the round-headed turnip is also transplanted, and the useful turnip that is used for asparagus, and

* Cresses. In Latin, *nasturtium.* Matth. ii. 149.

and the winter succory, and the seutlomolochum at the same time, and coriander, and the radish.

In the month of October are sown for the new year, the lettuce, the picridium, the comodianum, the polyclonum, the thridakin. The turnip is also transplanted, the beet, and succory, and cardamon, and rocket, and the white cabbage.

In the month of November fenugreek is sown, and the wild turnip is transplanted, and the late succory, and beet separately, and mallows separately. Coriander is also sown.

In the month of December are sown the lettuce, the picridium, the polyclonum, the thridakin, the comodianum.

II.—CONCERNING MAKING A GARDEN.

THE use of making a garden, is a very necessary convenience in life; you are therefore to prepare a garden for the sake of health, and for recovery from illness, not far from your house, but near it, that it may both afford delight from the view of it, and consummate pleasure from the fragrance of it, not lying in the wind from threshing floors, that the plants may not be destroyed

stroyed by the chaff. It is also necessary that a person who prides himself on raising esculent plants, should previously see the seeds are good, the ground suitable, and that there is water and manure; for good seeds will produce such as will be similar to them, and a suitable and productive soil will preserve what is entrusted to it, and water will make the plants grow by cherishing them, and manure makes the ground of a more mellow* quality, so that it may receive the water kindly, and that it may impart it to the roots, and promote the growth of the plant.

III.—CONCERNING LAND ADAPTED TO ESCULENT PLANTS.

THE best land for gardening is that which is neither a white clay, nor yet very rough, nor breaking into wide chasms in the summer; for the white clay, which is indeed frozen in the winter, and dry in the summer, destroys every thing that is planted in it, or it makes it weak and of no size; and the white clay would hardly be proper, if an equal quantity of manure were mixed with it: but that which opens in chasms, is altogether useless; and that which is rough,

can

* Lax, in the Greek.

can neither cherish the plants, nor afford circulation to the water: but there are a few rough and sandy situations well adapted to esculents, such as have plenty of nutritive mould, by which the roots are nourished. You may then with ease fix on a soil calculated for esculent plants; for having reduced it to a state of solution and washed it, if indeed you find it possessing plenty of nutritive[y] earth, you may judge that it is productive and good for esculent plants; but if it possesses a more watery substance, it is not good for esculent plants: that mould also which you find soft as wax in the hand, and very glutinous, you may judge to be improper for esculents.

IV.—WHAT MANURE IS FIT FOR ESCULENTS.

THE best manure of all for esculent plants, is ashes; for being very small and by nature warm, they kill the fly[z] and worms, and animals of this kind. The second manure is that of pigeons, and this has the power to destroy noxious animals; and if a little of it is applied, it will produce

the

[y] Mud, in the Greek.

[z] In Greek called ψυλλα. The Roman name of it, was *pulex*.

the same effect as a great quantity of other dung. Some indeed prefer asses[a] dung to that of pigeons, as rendering esculent plants more sweet. Goats dung is also very good, having the power of affording the same efficacy as those already prescribed. But for want of these, you are to use other manure, yet not fresh, for it produces noxious animals; but let it be a year old, having been frequently turned over with the spade.

V.—HOW ONE MAY HAVE ESCULENTS OF EVERY KIND IN SITUATIONS THAT HAVE NO WATER.

Having chosen what measure of ground you wish, and having dug it, to the depth of a foot or of a cubit, and having removed the mould that is dug, take some tiles and lay them in the place that is dug; lay on the mould clean and sifted, with very dry manure, and then set or sow the esculents. But some, instead of tiles, after having dug the place, lay it level with a coat of mortar, as they do when they fix the press, and they then lay on the mould and manure,

[a] See Columella, xi. 3, 12.

nure, and they cultivate[b] it. But whether a person uses tiles or a coat of mortar, it is proper to take care to encompass the place that is dug with walls, and to secure these also with mortar, or by means of tiles, so that the water that is poured for irrigation may by no means be wasted; and having done this, they cultivate the whole spot in the same manner as in moist situations, contented indeed in winter with rain water, and waterng it in summer; for they have no need of much water, when the wet of all the winter is preserved in the place by means of the contrivance thus invented, and not distributed into the adjacent situations. Some also, when there is not a sufficiency of water, make two gardens, one indeed for the winter season supplied by rain water, and the other for the summer in a shady situation, and lying to the north.

VI.—THAT A GARDEN MAY BE HEALTHY AND FLOURISHING.

THE garden will be healthy, if you pound some lotus[c] and put it in water, and irrigate it; if you pound fenugreek with water, and irrigate the

[b] Garden, in the Greek.

[c] Some suppose this to be *trifolium odoratum*, or the μελιλωτος of the Greeks.

the beds; or if you deposit the skull[d] of an ass in the middle of the garden.

VII. — THAT ESCULENTS MAY NOT BE EATEN BY THE FLY, NOR HURT BY NOXIOUS ANIMALS OR BIRDS.

ESCULENTS are not eaten by the fly, if you mix a little of the orobus with the seeds, when you sow them; and this is particularly proper for radishes and turnips. But others, acting in a more rational manner, sow or plant rockets[e] with them, and especially with cabbages; for these are hurt by the fly. If you also wish the seeds not to be hurt by any thing else, macerate them in the juice of sempervivum[f], before they are sown: and you will keep all garden and agricultural seeds safe from every noxious animal, if you macerate them in the juice of the pounded root of the wild cucumber, before you sow them: and esculents will keep unhurt, if you sow them in the hide of the tortoise[g].

VIII.

[d] See Palladius, i. 35.

[e] Εὔζωμον. This plant was by the Romans called *Eruca*. Matth. ii. 134.

[f] House-leek.

[g] There is a species of this animal called the coriaceous tortoise, which is covered with a strong hide. The method

VIII.—THAT CATERPILLARS MAY NOT INFEST HERBS OR TREES.

THROW some ashes of the vine into water for three days, and besprinkle the herbs; or suffumigate the trees or herbs with asphaltus or with sulphur[h] vivum. There will be no caterpillars likewise, if you macerate the seed in a lixivium of ashes of the fig-tree, and then sow it. You will also destroy the existing caterpillars, if you mix urine and amurca in equal quantities, and boil them over the fire, and then let them cool, and so irrigate the herbs. If you also take caterpillars from another garden, and boil them in water with anethum, and let them cool, and besprinkle the herbs, you will destroy the existing caterpillars. But some, when there are many caterpillars, introduce a female at certain[i] periods into the garden, without her shoes, with

 dishevelled

of drying the seeds in the hide of this animal, and of sowing them, is related by Palladius, l. i. c. 35.

[h] Impure sorts of brimstone now have this name.

[i] The original is here more expressive than it ought to be. Columella and Palladius seem to have copied this passgae. Col. *in hort.* v. 357. Pall. l. i. c. 35.

dishevelled hair, dressed in one garment only, and having no other, nor her girdle, nor any thing else; for she going three times round the garden in this figure, and coming out through the middle, will immediately make the caterpillars vanish. When you also fumigate fungous productions under walnut-trees, you will kill them: or if you make a suffumigation with the fæces of bats, and with the haulm of garlic, without the heads, so that the vapour may get round all the gardens, caterpillars[k] will be destroyed.

IX.—HOW THE PRASOKOURIDES[l] MAY BE DESTROYED.

COVER a fresh sheep's belly, containing the fæces, and unwashed, with mould, not to any depth, but on the surface; for you will find it full of these worms: and if you do this a second time, you may bring them all together, and you may take and destroy them; for the animal being fond

[k] This member of the sentence is deficient in the Greek.

[l] Hesychius says the Prasokouris was of a green colour, which devoured esculent plants in gardens. It had its name from the leek, which in Greek is called πρασον. Theophrastus mentions it, H. P. l. vii. 5. p. 140.

fond of dung, and being continually in it, will soon be taken.

X.—WHAT MAY BE USEFULLY RAISED NEAR ESCULENT PLANTS.

The rocket, when sown near them, is of service to all esculent plants in general.

XI.—TO INJURE THE GARDENER.

Having reduced the fæces of geese into solution in brine, water the esculent plants.

XII.—CONCERNING MALLOWS, AND ITS EFFICACY IN DIFFERENT DISEASES.

Mallows, being boiled and eaten by itself, removes hoarseness; and eaten with oil and fish-sauce[1], it has the efficacy of a cathartic. Its leaves, pounded with the leaves of the willow, are useful in all plaisters, for they remove inflammations, and they stop hæmorrhages; and they cause fresh wounds to cicatrize; and they will cure luxations and contusions. They will also cure the bites of

H 3 phalangia,

[1] *Garum*, pickle primarily made of the fish *garos*.

phalangia[m] and of reptiles, if having well-pounded onions and leeks you will mix them with the leaves of the mallows, and lay them on. If a person is also rubbed with the juice of mallows with oil, he will not be stung by wasps; and the juice cures one who has been already stung: and the leaves of mallows, being pounded and laid on, cure the person who has been stung. Mallows likewise being applied[n] cures the disease called *lichen*[o]; it stops hæmorrhages, and it cures the diseases of women. The juice of it also, when poured in, removes the ear-ache; and when it is taken with honey, it cures inflammations of the liver; and it causes persons labouring under the epilepsy to recover. The juice of this also cures diseases of the kidneys, and the sciatica; and a decoction of it being taken, cures the dysuria[p]; and it is useful to women in labour.

XIII.

[m] See Matthiolus, lib. vi. c. 42.

[n] Rubbed in.

[o] An asperity of the skin, which itches and produces matter. Avicenna says there are two sorts, and that the dry one is the worst.

[p] Difficulty of voiding urine.

XIII.—CONCERNING THE LETTUCE, AND ITS MEDICINAL QUALITIES, AND HOW IT GROWS WHITE AND BEAUTIFUL.

The lettuce is a moist and cooling esculent, for which reason it is adapted to violent inflammations. It is also an esculent that quenches thirst, and it is good for sleep, and productive of milk; and when boiled, it becomes more nutritious: but it is unfavourable to venereal embraces; whence the Pythagoreans say it is barren, and the women call it loose-bane[q]. But if you wish to have lettuces of good appearance, tie their leaves, that is, the upper part, two days before they are to be removed, for thus they will be white and handsome. Sand also, scattered over them, whitens them. The wild lettuce promotes appetite, loosens phlegm, restrains venery; taken with sweet wine or vinegar, it is good for the bile; with hysop and vinegar, it becomes a good stomachic; and boiled in rose-wine, and administered, it cures the disease called *cholera*[r], and

 the

[q] The Greek word is too accurately expressive, for the idea it conveys is not of the most modest kind.

[r] A vomiting and purging of bilious and acrid matter. Hippocrates divides this disorder into the moist and dry.

the juice of it cures the swelling of the viscera; and when mixed with the milk of a female, it cures the erysipelas[s]. The seed of it, pounded and drunk, cures the bite of the scorpion[t]; and it is of service in complaints of the thorax. When eaten, it makes persons in health sleep, and such as are ill, when it is laid under them, unknown to them; particularly if a person takes the plant with his left hand out of the ground, before the rising of the sun, and lays it privately under the bed of the patient. And the juice of it also, applied[u] to the forehead of a person that is ill, will make him sleep. If you also wish to make lettuces spread and produce many leaves, and not run into stalk, but to be of humble growth, transplant and water them; and when they come to the height of a palm, dig round them so that their roots may appear, and apply fresh cow-dung to them; and having laid on mould, immediately water them; and when they are grown, divide the plant with a very sharp knife, and set in a clear shell,

[s] This was by the Romans called *ignis sacer*. The English name is *shingles*.

[t] Matthiolus says there are nine sorts of this animal, lib. ii. c. 11. The Spaniards call it *alacran*.

[u] Rubbed on, in the Greek.

shell, that they may increase in breadth, and not in length. The lettuce also, constantly eaten, cures dimness[▼] of sight, and makes the patient see clearly, and especially if the plant is sweet. Lettuces also, plentifully eaten, indeed operate as a cathartic; but eaten in less quantity, they are astringent: they are also of service in a cold. If a person eats the lettuce fasting, the change of water will not affect him when he travels; nor will a person become intoxicated, if he previously eats it. The lettuce also grows fragrant when the seed of the citron is set in its seed, and thus sown. The seed, exhibited in a potion, stops the seminal[▼] efflux; it is therefore administered to such as are subject to it during sleep. The leaves of the lettuce also, five, or three, or one, will make a person that is ill, sleep, when privately laid under the bed, so that the parts taken from the stalk may be towards the feet, and those that were uppermost toward the head of the patient.

XIV.

▼ Called in Greek αμβλυωπια; obscurity of sight, without a visible defect of the organ. Hippocrates means the dimness of sight to which old people are subject, by this term, Aph. xxxi. 3. It is used for a *gutta serena* by Paulus and Actuarius.

▼ In Greek termed γονοῤῥοια. This word, in the modern practice of physic, is inacurately applied.

XIV. — THAT THE LETTUCE MAY PRODUCE PARSLEY, AND ROCKET, AND BASIL, AND SUCH PLANTS, FROM ITS ROOT.

TAKE a goat's or sheep's dung, and having perforated a small quantity of it, clear the perforated part, and set the seeds of the plants already mentioned, or other seed, in it, and set it not less than two palms deep, having thinly strewn some tender manure before; then lay on some fine mould, and water it gently; and when the seed shoots, water it, constantly scattering on some dung; and when it has grown in the stalk, bestow more attention on it, and the lettuce will grow with the seeds that are set in it. But some work[x] two or three goats or sheeps treddles, which are called *spurathoi*[y], and mixing the seeds with them, put them in a cloth, and tying them dig them in; and having bestowed the attention that is necessary, they produce a lettuce of varied growth.

[x] Pound, in the Greek.

[y] More frequently applied to the fæces of the goat.

XV.

XV.—CONCERNING BEETS, AND HOW THEY MAY BE MADE LARGE.

If you wish to make your beet of larger growth, and of whiter colour, cover their roots with fresh cow-dung; and as you do in respect of leeks, divide the shoot, and set in a flat stone or a shell. Beets being of a purgative quality, cherish the bowels, being eaten with oil and garum, and a little nitre, immediately after they are boiled. The juice of raw beet cures scaliness[1], and vermin in the head: and the juice of beet, mixed with wax and melted, and laid on a cloth and applied, cures all hard and inflated tumours; it also cures impetiginous diseases and baldness[2].

XVI.—CONCERNING DIFFERENT ESCULENTS, AND THEIR MEDICINAL POWERS.

As I am now interpreting the diction and poetical composition in the horticultural treatise of the most experienced Nestor, I have collected it

[1] Τα πιτυρα, a sort of scurf on the head like bran, whence it was called by the Romans *furfures* and *furfuratio*.

[2] In Greek called αλωπεκια, because the fox is subject to a distemper that resembles it.

it into a more finished system; and as I have made mention of different plants, I have thought it particularly necessary to arrange their medicinal powers for the use of farmers.

XVII.—CONCERNING CABBAGE AND ITS MEDICINAL POWERS.

It is indeed necessary to know that it is proper to sow cabbage in a brackish soil; it is moreover of use, when it has produced three leaves, to scatter pounded nitre, or brackish mould, that has been sifted, over it, that it may appear as if covered with hoar-frost; for it is then more easily boiled. Some also, instead of nitre, use ashes, and for the sake of destroying the caterpillars. Cabbage indeed, moderately boiled and eaten, is rather of a cathartic quality; but when more boiled, it becomes astringent. But be informed of the medicinal qualities of the cabbage. The cabbage forwards[b] the crisis of a periodical complaint, and especially if a decoction of it be drunk with sweet wine: and when eaten after it has been boiled, it cures phthisical habits. If a person boils and pounds cabbage, and mixes it with the water in which it has been boiled, and when [illegible] it

[b] Εμμηνων επαγωγος.

it is cool applies it to fresh and to inveterate wounds and tumours, they are softened. A fomentation of it, when boiled and mixed with barley-meal, and coriander, and rue, and a little salt, and applied, cures the gout[c] in the feet and in the joints: and its juice, mixed with Attic honey, is of service to the eyes, being[e] applied to the corners of them. It is also very nutritious, so that children that eat cabbage grow very fast: and if a person eat poisonous[f] mushroons, and drink the juice of this, he will be saved. Its juice also, drunk with white wine during forty days, cures persons who have the jaundice, and pain in the spleen: when drunk with black wine, it is of service in coughs. Its leaves being pounded, remove the distemper called *lichen*; and when immediately applied, they cure the bites of venemous reptiles. Cabbage, when mixed with the *alumen*[g] *rotundum*, and macerated in vinegar, cures

[c] Called ποδαγρα: the other was denominated αρθριτις. Dioscorides recommends the juice of it with the meal of fenugreek for the gout; ii. 46.

[e] This is mentioned by Pliny, xx. 9.

[f] This mushroon was called βωλιτης. Matthiolus says it grows on the larch, l. i. c. 7.

[g] Matth. v. 82.

cures the itch[h] and the leprosy; and ashes from its roots are of service in burns. Its juice taken with oil, and kept in a considerable time, removes ulceration in the mouth and in the tonsils[h], and the swelling of the uvula. The juice with wine, as a fomentation, is of service to the ears: when pounded and applied, it will very much relieve persons in inflammations: and when boiled, and previously eaten, it will relieve the voice and its organs[i], for which reason singing-masters have been in the habit of using it. Its seed or its leaves, when pounded, if applied with silphium[k] and mixed with vinegar, cure the bites of the *mus araneus*[l], and of a mad dog, and of a dog that is not mad. A drink of the leaves, when gathered and dried, and then boiled, is given the patients. When pounded and laid on, it considerably lessens the pain of the spleen; and when eaten raw, it promotes sleep, and does

not

[h] In Greek ψώρα. Modern physicians make this the genus of the disease.

[h] Glands seated near the isthmyon, or the narrow passage between the mouth and the gullet.

[i] The *aspera arteria*, or windpipe.

[k] It has been supposed that the silphium of the ancients was procured from the plant called *laserpitium*.

[l] The Italians call this *topo ragno*; and the Germans *spitzmans*. It is common in Italy. Matth. ii. 62.

not suffer the patient to be incommoded by dreams. But Nestor says in his horticultural treatise, that the cabbage is an emblem of the tear of Lycurgus: for, says he, Bacchus being afraid of him, went under the sea, and Lycurgus being bound with the vine, shed a tear, and he says that from the tear sprung the cabbage, and that on this account the cabbage and the vine have an antipathy to each other. For instance, if the cabbage at any time approach the vine, it immediately withers, or the shoot of the vine decays: and on account of the antipathy existing between them, if it happens, in a cold in the head, that the uvula or the cionis[m] is relaxed, the juice of raw cabbage, applied to the head, draws up the uvula to the roof of the mouth: and if it happens that the vine and the cabbage are planted near each other, the shoot of the vine, as it increases in growth, when it is going to approach the cabbage, does not grow up straight, but it draws back, as if mindful of the mutual antipathy. If a person likewise pours the least quantity of wine on cabbage when it is boiling, it ceases to boil, and its colour will be changed. Persons also, who wish to drink much wine and not to be intoxicated, previously eat raw cabbage.

[m] Arctæus calls the uvula by this name.

bage. But it is proper to know that old cabbage seed will produce the raphanus[n].

XVIII.—CONCERNING ASPARAGUS.

Asparagus likes level ground, and it is sown in the spring; therefore make trenches three inches deep, and set two or three grains of seed in each place. Let the trenches be nine[o] inches distant from each other: and let not the plants that are sown be disturbed during the first year, except in weeding. If you indeed wish to produce a good crop of asparagus, pound[p] the horns of wild rams small, and throw them on the beds, and water them. Some relate what is still more paradoxical, that if the rams horns, being whole, be bored and laid down, they will produce asparagus. If you also wish to have asparagus all the year, when you take the seed, immediately weed round

[n] The Roman agricultural writers were of opinion that the seed of the cabbage changed its quality by age. Palladius, iii. 24. Pliny, xix. 10. Varro, i. 40. Theophrastus, C. P. iv. 3.

[o] This measure was called by the Greeks σπιθαμη, the distance between the thumb and the little finger when expanded. In English measure, 9.0656¼ inches.

[p] Pliny mentions this, l. i. tom. 3. p. 610. Dioscorides rejects the idea as not worthy of credit, l. ii. c. 152.

round the roots on the surface; for the plant being thus dressed will again produce asparagus. This esculent does not love irrigation, but dryness rather: but if a person water the plants before the autumn, he will make them more tender and more flourishing.

XIX.—CONCERNING GOURDS AND CUCUMBERS, AND THEIR MEDICINAL QUALITIES; AND HOW ONE MAY MAKE EACH OF THEM HAVE NO SEED INTERNALLY[q], AND RAISE THEM EARLY.

They will have no seed internally thus.—Dig into the ground the first shoot or slip of the gourd or cucumber, as soon as it is of a proper size, as you do the shoots of the vine, so that the extremity of the slip may only be bent; and when it is grown, lay mould on it again in the same manner, and a third time, and cutting the intermediate shoots and those above ground, and leaving only the last, I mean the third, you will have gourds and cucumbers without seed. You will also raise cucumbers and gourds without seed, if you macerate the seed before you sow it, three days, in oil of sesamum. You will also

 raise

[q] The word seems superfluous.

raise early cucumbers and gourds in this manner: lay some sifted mould mixed with dung, having properly moistened it, in baskets or in useless earthen pots, and anticipating the usual season, for instance, in the beginning of the spring, plant the seeds: and when the sun shines, and it is warm weather, and when it is rather showery, set the baskets in the open air, and toward the setting of the sun take them in under cover; and do this constantly, watering them when necessity calls for it; and when the frosts will perfectly cease, take the baskets or pots into a well-wrought spot, and dig them in evenly with the soil, and bestow on them the attention that is necessary; and if you take away the extremities of the shoots, they will bear fruit more speedily. You will also make them long, thus: if, pouring water into a mortar, or into any other vessel, you set it within five or six inches of them, for the cucumbers will be proportionably longer the next day; but if the vessel has no water, the cucumbers will grow crooked, and they will be bent backward: thus they are indeed so partial to moisture, and so averse to dryness. They will be also transformed into any shape you wish, if you make earthen vessels, and set them in when small, and tie them, for they will fill the figures and impressions; on which principle also,

if

if you divide a reed lengthways, and excavate it, and set in a cucumber, and tie it in it, or if you put in a gourd while it is small, it will fill the reed, growing along the whole extent of it. Gourds[r] are indeed grateful to the viscera. They will cure pains in the ear, their juice being poured into it. The seed of the cucumber moderates heat of urine, and it is diuretic. These will not be hurt by the fly, if you fix slips of origanum near them while they are small, for they destroy the fly, and they serve as a preventive. If you also lay cucumbers of proportionable length near a sucking child, when he is feverish and asleep, he will be soon cured, for all the heat is attracted by the cucumber. The root of the wild cucumber also being dried and pounded, and drunk with sweet wine, or with hydromel, is of wonderful efficacy for vomiting. If you also wish to have cucumbers less watery, when you dig the trench in which you are going to plant them, fill it half full with straw*, or with dead shoots, and lay on mould, and plant them without watering them. Some indeed make them have a cathartic quality thus: having pounded

 the

r They are eaten in the eastern countries, from June to October.

* Chaff, in the Greek.

the roots of the wild cucumber, they macerate them in river water during two or three days, and they water them during five days with the liquor, and they do this five times. But they become of a more cathartic quality, if, after they have shot, you dig round the roots, and pour a portion of hellebore over them, and having laid on mould, let them remain. Lay cucumbers in sweet and not in sour lees[t] of white wine, and having filled the vessel stop it, and they will keep quite fresh: and when laid in brine, they will keep. You will preserve cucumbers in perfection, if you suspend them in a vessel having a little vinegar, not touching the vinegar, and stop it, that there may be no vent; and you will have them fresh during the winter. But you are to preserve gourds thus: gather them while tender and cut them, then boil some water and pour it on them, and having cooled them all night in the open air, lay them in strong[u] brine, and they will keep a long time. You will also make gourds of a cathartic quality, if you macerate the seed a night and a day in scammony[v]. You will raise cucumbers and gourds by planting the seed in an inverted position.

XX.

[t] Turned, in the Greek.

[u] Sharp, in the original.

[v] Matth. iv. 164.

XX.—CONCERNING MELOPEPONES[v].

THEY are indeed cooling, and they are of a consummate use to a person who[x] wishes to vomit occasionally; for they, after meals, remove phlegm, bringing up a very considerable quantity, and they purge the head. You will make melopepones have the scent of roses, if you lay their seed with dry roses, and set them together. They have also the powe of quenching[y] thirst in a fever. You will likewise make all the fruit of the cucumber plantations sweet, if you macerate the seed in milk and honey, and when dried sow it. If you also macerate the seeds of the cucumber plantations in the juice of the sempervivum, you will preserve them unhurt. Let no female at certain periods enter the cucumber plantations, for this is unfavourable to the fruit, and it will grow bitter.

XXI.—CONCERNING THE TURNIP AND ITS SEED.

THE turnip is not adapted to cure the diseases of the human species; but has the power of

 curing

[v] Melons, Matth. ii. 128.

[x] This is mentioned by other writers. Diosc, ii. 164. Pliny, xx. 2.

[y] Some other writers mention this. Rhazes, lib. i.

curing the contusions of animals, being applied under the hoof, and tied. But the seed of the turnip after three years produces cabbage, and *vice versâ.*

XXII.—CONCERNING RADISHES.

Radishes will be sweet, the seed of which has been macerated in œnomel, or in the juice[1] of the dried grape. They are useful in phlegmatic and nephritic[2] cases, especially if a person boils down the outside of them with wine, and takes it fasting early in the morning; and when eaten with honey, they cure coughs; and their seed, when heated, and taken with honey, likewise removes coughs and difficulty of breathing. Being given to women in child-bed, they produce plenty of milk. They provoke to love: they are hurtful to the voice. If a person takes them fasting, he will be secure from the effect of poison. Their juice, when taken in water, is an antidote against poisonous mushrooms, and other poisons. If a person also carefully smears and rubs his hands with the juice of the radish, he may take hold of

noxious

[1] It must have been necessary to macerate this grape to procure this juice.

[2] Diseases of the kidney.

noxious reptiles without fear or danger. When laid on scorpions, they immediately kill them. When taken out of water, they relieve in the dropsy and in the spleen. Their juice drunk with sweet wine, before going into the bath, cures the jaundice. If a person takes them with honey, and retains them a short time, and throws them up, they purge the stomach[b], for they are adapted to excite vomiting, an they promote an appetite in those who loathe their food. They also cure the quartan ague, if a person constantly takes and throws them up. If the water happens to be unwholesome in any situation, it becomes more wholesome if it is boiled with radishes. They are only injurious to the teeth. When boiled, they are an useful food to persons who spit blood. If a person previously eats radishes, and is bit by a scorpion, he not only will not die, but he will soon become convalescent. The radish being pounded and applied to wounds received from military[c] weapons, will very soon cure them. It also

[b] Την ανω κοιλιαν, the upper belly. Κοιλια is used by Hippocrates sometimes to signify the cavity of the breast and the lower belly. The expression here used evidently means the stomach.

[c] Βασανοι in Greek, called *tormenta* by the Romans, were machines for discharging stones and missile weapons. Cæs. Bell. Gall. iv. 25.

also removes warts, and it restores the hair in the *alopekia*[d]; and when eaten by itself, it is of service to the breath.

XXIII.—CONCERNING PARSLEY.

Parsley will grow large, if you take as much as your three fingers will hold, and tie it in an old cloth, then scattering some manure on it, you will immediately water it. Parsley will likewise grow very large, if, having dug round its roots, you throw some chaff over them, and water them. Parsley will also be curled, if its seed is gently pressed[e] and rolled, before it is planted. Parsley, when eaten, makes women more inclined to love; for which reason it is not proper to permit women giving suck to eat parsley, as it is very apt to keep back their milk. But it contributes to make the breath sweet; persons therefore having fetid breath, if they eat it, remove the disagreeable smell: and they say that persons on the stage eat it, that their breath may be sweet. Parsley, made into a cataplasm with bread, cures the erysipelas; and a decoction of it, taken after it has settled,

[d] Baldness. The term has been already explained.

[e] Pressed in a mortar, in the original.

settled, is good[f] for the stone; and it cures the dysuria[g], and disorders of the kidneys.

XXIV.—CONCERNING MINT.

Mint is deemed to be of no use; for if it is applied to any wound, it is not easily healed; and if it is put in milk, and the rennet[h] is afterwards put in, the milk will not coagulate[i]. It is also ill calculated to raise the tender passions.

XXV.—CONCERNING GARDEN AND WILD RUE.

Rue is not partial to manure, but it likes warm and sunny situations; it is moreover proper to scatter some ashes over it in the winter, for, on account of the natural warmth of these, it resists the cold. But you ought to plant rue in earthen vessels: and it is proper to take care that a polluted female may not approach or touch it, for this is pernicious to it. If a person stops his ears with the tender pith of rue, he will cure the head-

[f] Causes stones to discharge, in the Greek.

[g] Difficulty of voiding urine.

[h] Η πιτυα. It is probable this was made from some species of pine.

[i] Dioscorides mentions this, iii. 41. So does Pliny, xx. 14.

head-ache. The juice also of rue, mixed with the milk of a female and applied[k], is good[l] for the eyes; and two parts of Attic honey, and one part of the juice of rue, being mixed and applied, remove dimness[m] of sight and cataracts[n] of men and animals; and the wild rue, being eaten and administered in a draught, has the same effect The seed also of the wild rue, when taken in a potion for fifteen days, destroys a fœtus[o], for it is by nature inimical to women with child: and when taken with wine, it removes the pains and injuries of venemous beasts. When it is taken in a potion, it is likewise serviceable in epilepsies, and it removes pains in the thorax; and with wine or oil of roses, it purges[p] the ears.

XXVI.

[k] Rubbed in.

[l] Bestows clearness of sight, is the Greek expression.

[m] In Greek called αχλυς, sight diminished or abolished, from a dark barrier between the object and the retina.

[n] Υποχυσις, which Celsus calls *suffusiones*. Galen says, a cataract is a dryness or concretion of the crystalline humour.

[o] Embryo, according to the Greek. Hippocrates calls a child, in its third stage in the womb, by this appellation.

[p] i. e. clears from impurities.

XXVI.—CONCERNING ROCKET.

The seed of rocket drunk in wine, cures the bite of the *mus araneus;* it brings down the round[q] worms; it extenuates the pain of the spleen: when mixed with ox-gall and vinegar, it removes black scars; and it cures warts; and rocket mixed with honey removes spots in the face: when drunk with wine, it makes persons that are flogged feel less pain. Three leaves of rocket also, taken in the left hand, cure the jaundice. The rocket also, being sown near them, is of service to all esculent plants. The rocket likewise cures fetid smells of the arm-pits.

XXVII.—CONCERNING CARDAMON[r].

The seed of cresses mixed with bean-flour, a due portion of lixivium having been poured into it, cures the king's evil[s] and carbuncles[t]; but you are to make use of cabbage-leaves instead of linen[u]: and when taken in a potion with mint and wine,

[q] By the Romans called *lumbrici.*

[r] In Latin, *nasturtium.* Cress.

[s] In Latin, *struma,* and *scrofula.*

[t] From *carbo;* crusty ulcers beginning with a pustule like a burn.

[u] For spreading the plaister.

wine, it discharges the round and the tape worms: when boiled with goats milk, it cures pains in the thorax: and when there is a suffumigation of it, it keeps off serpents. They say that persons who eat cresses are quick of apprehension. They are unfavourable to the tender passions. Taken with honey, they cure coughs: they are also applied to deep sinuous ulcers. The juice of them also prevents the falling of the hair. Applied with goose-grease, they cure small ulcers and scales in the head. With leaven, they bring boils to maturity. They also say that the juice of them, poured into the ears, cures the tooth-ache.

XXVIII.—CONCERNING SERIS, OR TROXIMA.

SERIS[v], that is, *troxima*[w], being dipt in vinegar and eaten, is good for the stomach. Its juice is of very great use to persons spitting blood, if it be drunk every other day. When pounded and laid under the left breast, it cures the cardiac[x] passion:

[v] Succory.

[w] The Greeks gave it this epithet from its edible quality.

[x] This disorder is often mentioned by the ancients, and it is supposed to be what is now termed *syncope*. Cœlius Aurelianus says, it has its name from the part affected, *i. e.* the heart.

passion: and the juice of it, when it has been a little dried in the sun, and then pounded, is given to persons having diseases of the liver: and if a person beholds it after[r] the rising of the moon, and will swear by it, that he will not eat seris nor horse-flesh during thirty days, he will not have the tooth-ach.

XXIX.—CONCERNING LEEKS.

SOTION recommends, after the leeks are sown, immediately to tread the bed and not to water it, but to let it lie neglected during three days, and to water it the fourth day; for thus they will be very beautiful. The leek will be very strong, if you mix sand with the mould in planting it. The leeks will be likewise large, if, when you transplant them, you lay a shell or a flat stone under them, and do not water them. They will also be large, if, when you transplant them, you prick the head of the leek in the middle, not with iron but with a peg[s] or a reed, and lay in some of its seed; for the seed falling in is united, and it makes

[r] Cornarius says, the first day after the rising, &c.

[s] In Greek κερκις, which sometimes meant a weaver's shuttle, and sometimes the plectrum of the Romans, with which they played on the strings of musical instruments.

makes the leek swell. But some lay in, not its own but turnip seed, and it is united, and it becomes the cause of augmentation. But the leeks will be much larger, if you take some seed with your three fingers, and tie it in an old linen cloth, and then scatter some manure on it, and immediately water it; for all the seeds being united produce one large leek. The case is the same in respect of parsley. If a person also eat cumin before leeks, he will not smell offensively. If you also apply pounded leeks to the bites of venemous reptiles and of phalangia[a], you will more speedily cure them than with any other medicine. Boiled leeks also, administered with honey, usually cures all affections of the arteries; and its seed, drunk with sweet wine, cures the dysuria; but when it is constantly eaten, it hurts the sight, and it becomes injurious to the stomach. The juice of them[b] also being drunk with melioration[c], contributes to cure persons bit by venemous beasts; and they themselves being applied as a cataplasm are useful. It being poured in with vinegar and olibanum, or with milk, or with oil of

[a] The tarantula is a species of phalangium; Matth. lib. vi. c. 42.

[b] As in the Greek.

[c] Mixture of honey and water.

of roses, is of service to the ear-ache, and to noise in the head. It also cures the epinyctis[d]. It is proper to use leeks when reduced to a state of solution, for they are not less nutritious than flesh. This esculent is applicable to pains in the side.

XXX.—CONCERNING GARLIC.

Garlic grows very good in a light-coloured soil; and when eaten, it brings off the round worms, and it is good for making water; and applied in a cataplasm, and eaten, it is of service to persons bit by a viper, or by a mad dog. When they are also roasted[e] and wrought with honey, and applied, they cure the blood-shot[f] eye and the *alopekia*. They also stop the tooth-ache, being held in the mouth; and with oil and salt they cure pimples[g]. They also remove warts and the lichen. Garlic, when boiled, and eaten raw, is of service to inveterate coughs: and if a person previously

[d] A pustule which rises in the night; Celsus says it is of a bad kind, of a white or livid colour, with a violent inflammation.

[e] Burnt, in the Greek. Transition as in the original.

[f] In Greek called υπωπια.

[g] Εξανθηματα; such as elevate the skin and look florid.

previously eats garlic, he will be unhurt by serpents and other poisons; and when pounded and laid on, it cures persons who have been stung by serpents. When taken in a potion with wine, it is of consummate use. It is also of great service to persons who cannot digest their food. It is diuretic; it cures diseases of the kidneys, and it keeps off injury from unwholesome water. But if you wish your plants to be of a better flavour, set them when pressed. One sort of the garlic is mild, and raised in the garden; the other is wild, which they call the serpent-garlic[h]; and the wild sort is more adapted to the cures that have been mentioned, than the mild one. You will bring your garlic to a grateful smell by throwing in some refuse[i] of your olives when you plant them: and they will be free from offensive smell, if they[k] are planted and taken up when the moon is under the horizon. Some also say that they are less offensive, if a person chews a raw bean immediately after eating them.

XXXI.

[h] So called, because it cured persons stung by serpents.

[i] Kernels, in the original.

[k] Σπειρηται; this word is used for planting as well as sowing, as the Roman word *sero*.

XXXI.—CONCERNING ONIONS.

When you transplant onions, take off their lower and their upper ends, and they will grow large: and twenty days before you transplant them, dig the ground, and let it be dry, that it may be free from all moisture; then plant them, and they will be much larger. If you also trim[l] their heads and set them, they will be the larger: and when planted in a red-coloured soil, they will be good as garlic in a white soil. But that onions may keep sound, put them in warm water, and dry them in the sun; and when they are dried, lay them in barley-straw, not touching one another. Onions, being pounded with honey, are proper to be applied to every wound; and a person who takes some choice onions every day, and eats them with honey fasting, will pass his days in good health. An onion indeed will cure a wound; but if garlic be applied to the body in a sound state, it will form an ulcer. Onions, rubbed in with vinegar in the sun, cure the disorder called *alphus*[m]; and, when pounded, they speedily cure the *alopekia:* and their juice is of service to ears that

 suppurate;

[l] Take off the external coats.

[m] A sort of white leprosy, called by the Romans *vitiligo.*

suppurate; and when rubbed in, it is of use in the quinsey: and the onion is also of utility to dimness[n] of sight; and when roasted and administered, it cures a cough.

XXXII.—CONCERNING CAUCALIS.

CAUCALIS[o], being eaten, cures nephritic complaints by its diuretic power; and the water of it, drunk with sweet wine an hour before going into the bath, cures persons having the jaundice, by sweating; and being eaten with oxymel[p], and thrown up, it clears the stomach; and it cures the atrabilis[q], and loss of appetite, and the quartan fever.

XXXIII.—CONCERNING PULEGIUM.

PULEGIUM[r] promotes digestion, being pounded when dry, and taken after eating: and being masticated

[n] *Αμβλυωπια*, which has been already explained.

[o] The Italians call this *caucalide*, and *petrosello salvatico*, i. e. wild parsley.

[p] Galen has left a prescription for making oxymel, lib. iv.

[q] Black bile, or melancholy. Dr. Cullen describes it, 1029.

[r] Pennyroyal.

ticated and applied to the eye-lids, it cures the opthalmia[s] in the height of the disease; so that a person that has tried it, would use this for the eyes in preference to the most approved collyria[t].

XXXIV.—CONCERNING ANETHUM.

Anethum[u] being eaten, hurts the sight.

XXXV.—CONCERNING SISYMBRIUM.

The skimbron, which some call *sisymbrium*[v], promotes appetite, and it is diuretic; and it likes a temperate and dry air, and a situation well laid to the sun, by no means incumbered with trees; and it is raised in mould, and it grows. It is sown and planted; but when sown indeed, it will produce seed the third year; but if a person will plant it from the top of the root, from which he has the shoot, which some call the eye, it will produce seed[w] the first year.

[s] Book ii. c. 18.

[t] Medicines for the eyes.

[u] Dill.

[v] Matthiolus enumerates six species of this plant; lib. ii. 121.

[w] Τον καρπον.

XXXVI.—CONCERNING BULBS.

Bulbs[x] will be large, if, as with regard to leeks, shells are set under the roots of them when they are planted. The bulbs are indeed planted from the calends of November to the calends of February.

XXXVII.—CONCERNING SQUILL.

The flower of the squill[y] growing like a rod, and not speedily withering, portends a fruitful season.

XXXVIII.—CONCERNING LAPATHUM.

The seed of the wild lapathum[z], taken with wine, cures the cardiac passion and the dysentery;

[x] The Greeks had two plants, which were denominated βολβος εδωδιμος and βολβος εμετικος. The first is mentioned by Galen, who points out many of its properties; lib. vi. The second is sometimes called *muscari*. The epithet *bulbous* was most probably borrowed from these plants; Matth. ii. 165, 166.

[y] Sea-onion.

[z] *Rumex;* Matth. lib. ii. 108.

tery; and, being tied round the left arm, it cures sterility in women. The root of the wild lapathum also cures the jaundice and the dropsy: and, being boiled with vinegar and applied, they say it cures the leprosy, and the lichen, and the vitiligo.

XXXIX.—CONCERNING ARTICHOKES.

PLANT artichokes[a] in the month of November, for, being then planted, they will come[b] to perfection in the spring: but when planted in the spring, they will hardly come to perfection the same year, and they will be weak, and the edible[c] part small. But take the plants of the artichokes which grow on the large stems, cutting them with a sharp knife, having first dug the circumjacent soil, and take some part of the root along

[a] Theophrastus says that the species here mentioned, κιναρα, was the Sicilian κακτος, artichoke, and he says it did not grow in Greece. The Greek artichoke was called σκολιμος.

[b] "Will produce fruit," is the Greek expression; which, although forcible, and to which Athens and Rome gave currency, I did not think myself justified to use, because it might not seem to be exactly adapted to the peculiar taste of the English tongue.

[c] The fruit, in the Greek.

along with them; and set the plants in well-wrought mould, scattering some old compost over them, and water them regularly in the summer; for thus you will have the edible part tender, and of a better size. You will also make your artichokes well flavoured, if you macerate their seed in the juice of roses, or of lilies, or of the bay, or of any other savoury plant, during three days, and so set it. You will also make artichokes grow without prickles, if you rub the points of the seeds against a stone. Some indeed affirm, that, at what time soever artichokes are planted, they will come to perfection at the same time; and that on this principle you may have artichokes all the year. You will raise artichokes[4] having the flavour of the bay, if you take the seed of the bay, and, having perforated it, set the seed of the artichoke in the hole, and so plant them. They also grow without prickles, if, having decorticated the root of a lettuce, and having cut it into small pieces, a seed is set in each of the pieces, and so planted. Mice are very apt to eat the roots of artichokes, and they resort to them from a considerable distance; but we shall keep them off by wrapping the roots in wool, or by laying hogs dung, or ashes of the fig-tree, on the

[4] Called bay-artichokes, in the original.

the roots, either from a natural antipathy, or from an aversion to the smell. You will also raise artichokes of a sweet flavour, by macerating the seed in milk and honey, and sowing it when dry.

XL.—CONCERNING PURSLANE.

PURSLANE, applied as a cataplasm, stops the erisipelas: and a leaf of it laid under the tongue, makes[e] persons less thirsty.

XLI.—THE RAISING OF MUSHROOMS.

CUT down a black poplar; and, having reduced some leaven into a state of solution with water, pour it on the part of the stem that is cut, as it lies on the ground, and mushrooms[f] will be soon raised. But if you wish to raise mushrooms from the soil, choose a mountainous situation, a rarefied soil, that has been used to produce mushrooms;

[e] Pliny says the same thing, xx. 20.

[f] The poplar mushrooms, in the original. Dioscorides prescribes a method of raising mushrooms from the white and black poplar; lib. i. c. 109. Pliny has also transmitted his thoughts on this subject; xxii. 23. Nicander, in his Georgics, is said to have given the preference to mushrooms raised from fig-trees; Athen. p. 61.

rooms; and heap up dead shoots, and all things of a combustible nature; and when you see the air clouded, as if a shower is impending, set fire to them; for thus mushrooms will be spontaneously produced. But if a shower is not coming forward when you begin to make your pile, besprinkle the places where the fire is made, with consecrated and clean water, in imitation of a shower, and mushrooms will be raised, although of inferior kind; for those are better that are cherished by showers.

BOOK

BOOK XIII.

HYPOTHESIS.

These things are in this Book, being indeed the Thirteenth of the Select Precepts of Agriculture, and comprising the order of locusts, and of the bruchus, and of scorpions, and of serpents, and of such venemous animals; and a cure also for the fly, and for bugs, and for small flies, and for other noxious animals of the kind.

I.—CONCERNING LOCUSTS.

MANY things have indeed been mentioned by the ancients to drive away locusts, but I select and prescribe such things as are more readily done. If a cloud of locusts is coming forward, let all persons remain quiet within doors, and they will pass over the place: but if they suddenly arrive before they are observed, they will hurt nothing, if you boil bitter lupines, or wild cucumbers, in brine, and sprinkle it, for they will immediately die. They will likewise pass over the subjacent spot, if you catch some bats, and tie them on the high trees of the place: and if you take and burn some of the

the locusts, they are rendered torpid from the smell, and some indeed die, and some drooping their wings, await their pursuers, and they are destroyed by the sun. This is a natural cause; for if you take a scorpion and burn it, you will also take the rest, or you will chase them to flight: and it is the same in respect of ants, as experience has taught us; and the same thing happens also with regard to other animals of this kind. You will drive away locusts, if you prepare some liquor from them, and dig trenches, and besprinkle them with the liquor; for if you come there afterwards, you will find them oppressed with sleep; but how you are to destroy them is to be your concern. A locust will touch nothing, if you pound absinthium, or a leek, or centaury with water, and sprinkle it.

II.—CONCERNING THE BRUCHUS.[1]

SET three grains of mustard around the stem of the vine at the root; for these being thus set have the power of destroying the bruchus.

III.

[1] A species of locust. It is mentioned in Leviticus, xi. 22.

III.—CONCERNING WEASELS.

MACERATE sal ammoniac and wheat together, and scatter these in the places where they frequently resort; for, when they eat them, they will either die, or they they will betake themselves to flight. They also say, if a person catches one of them, and cuts off its tail, or the testes, and lets it escape alive, they will not in future be found in that place.

IV.—CONCERNING DOMESTIC MICE.

MICE are killed with hellebore put in barley meal; or with the seed of wild cucumbers with black hellebore, and colocynthis[h], and barley-meal. Suffumigation of calacanthus[i] and origanum, and of parsley-seed and of melanthium[k], will drive them away: and if you lay some oak-dust at the hole, they become scabby and die, when covered with the dust. If you mix the filings of iron with leaven, and lay it where they abound, they perish when they have eaten it. If you also wish to make mice lose

[h] Called by the Spaniards and Italians *coloquintida*. Matth. iv. 171.

[i] Supposed to be the same as *glaucium*, which grows in Syria. Its leaves are like those of the horned poppy. Diosc. lib. iii. c. 100.

[k] By the Romans called *nigella* and *gith*. Matth. iii. 78.

lose their sight, pound some tithymallus[l], and mix it with barley-meal and œnomel, and lay it for them; for, when they eat it, they become blind. Anatolius and Tarentinus, in their treatise on the granary, have prescribed the same medicaments for the destruction of domestic mice. If you also catch one, and excoriate its head, and let it go, the others will betake themselves to flight: and when they eat the root of bramble with butter and bread and cheese mixed, they die. But some pound and sift white hellebore and the bark of the cynocrambe[m], and make them into a mass, and set it in the holes. Mice will be driven away by a suffumigation of the hæmatites[n] and the green myrtle. Anatolius says, if you put some amurca in a brazen dish and set it in the middle of the house in the night, you will bring all the mice together. In other respects, his sentiments are the same as those of Didymus.

V.—CONCERNING FIELD MICE.

Apuleius recommends to smear seeds with ox gall, and the mice will not touch them; but it is better

[l] Spurge. In Spanish, *lechetrezna*. Matth. iv. 159.

[m] Sometimes called *brassica canina*, wild Mercury. Matth. iv. 184.

[n] *Hæmatites*. Matth. l. v. c. 101.

better to pound in the dog-days, the seed of hemlock with hellebore, and to mix it with barley-meal; or seed of the wild cucumber, or of the hyoscyamus,[o] or of bitter almonds with black hellebore, and to mix it with an equal quantity of barley-meal, and to mix it up with oil, and to lay it near the holes of the field-mice; for when they eat it, they die. But persons in Bithynia, who have tried the experiment, stop the holes with rhododaphne,[p] so that they, endeavouring to get out, gnaw it, and thus they perish. Take some paper and write these words on it: "I[q] adjure the "mice taken in this place, that you do me no "injury yourselves, nor suffer another to do it; "for I give you this ground (and you mention "which); but if I again take you on this spot, I "take the mother of the Gods to witness, I will "divide you into seven parts." Having written these words, fasten the paper in the place where the mice are, before the rising of the sun, to a stone of spontaneous production, and let the letters be turned externally. This is written by me, that I may

o Henbane. Matth. iv. 64.

p Sometimes called *rhododendrum* and *nerium*. Galen mentions its poisonous quality, lib. viii.

q The form of this exorcism seems to be of oriental extraction.

I may not seem to omit any thing; but I do not receive all these things, far be it from me, and I advise all to do the same, so as not to have recourse to any ridiculous things of this kind.

VI.—CONCERNING THE CAT.

A CAT[r] does not touch a fowl, if some wild rue be tied under its wing.

VII.—CONCERNING MOLES.

IF you wish to destroy moles, pound and sift some white hellebore and the bark of the cyno-crambe, and macerate them with barley-meal and eggs in wine and milk, and you are to make them into pellets[s], and you are to set them in their holes. Or put some chaff, and a sufficient quantity of the gum[t] of cedar and brimstone in a walnut-shell, or in some small vessel; and in the place which the mole inhabits, be sure to stop all

[r] The juice of rue is recommended for this purpose by Dioscorides, lib. iii. 52.

[s] Mass, in the original.

[t] The sap of the cedar was deemed to be of singular efficacy in preserving dead bodies among the Greeks, for which reason it is called by Dioscorides νεκρων ζωη.

all the small holes, that the smoke may not find its way through them, but through a larger one, through which there is a currency of air, set in the bottom of the nut; and having properly adapted it to the hole, blow in the smoke, that all the smell of the gum of cedar, and of the brimstone, may be driven in and suffocate the mole; and so go round the harbour of each mole; and having done this, you will destroy them all.

VIII.—CONCERNING SERPENTS.

THERE will be no serpents in a place, if you plant absinthium, or artemisia[u], or abrotonum, round the villa: and you will drive away those that are there, if you make a suffumigation with the root of the lily, or with hartshorn, or with the hoofs of goats[v]. You will also drive away every reptile, if you pound and mix the juice of laserpitium, and nigella, and galbanum, and hartshorn, and hyssop, and sulphur, and pyrethrum[w], and the hoofs of a goat, and then make them quite fine, and pour some vinegar on them, and

[u] Mugwort. Matth. iii. 111.

[v] Goats hair was also recommended. *Archigenes apud Ætium*, l. i.

[w] Pellitory of Spain. It acquired its original name from the heat of its root. Matth. iii. 71.

and make them into small pellets, and make a suffumigation of them: and each of them, when fumigated, drives away reptiles. Some also say that a branch of the pomegranate keeps off venemous animals, and for this reason they think proper to fix it on common coverlids for the sake of security. Serpents also will not infest a pigeon-house, if you write Adam[x] on the four corners; and on the windows, if there are any. But Democritus says that a serpent does not stir, when a feather of the ibis[y] is thrown at it, and that it dies when leaves of the oak are thrown upon it, and when a person fasting spits[z] into its mouth. Apuleius also says that [illegible] a serpent

[x] The Sybilline Oracle said, that God formed this word, and that it referred to the four quarters of the world, each letter alluding to one of them. Ανατολη, Δυσις, Αρκτος, Μεσημβρια. ادم, in the eastern languages, signifies Adam, or the first of the human race; and he is said to have acquired this appellation from the colour of the earth, of which God formed him. Many of the fanciful vagaries of the Greeks derive their origin from the east; and although the Sybilline Oracle so expediently perverted the meaning of this word, it must be evident that he was indebted to that country for the groundwork of his ingenious conjecture.

[y] This is mentioned on another authority. *De sympath. et antipath.* Fabric. B. G. T. iv. p. 337.

[z] Pliny says the same thing, xxviii. 4.

a serpent being *once* struck with a reed, becomes torpid; but many times, that it acquires strength. If a person lays hold of the tail of a serpent going into its hole with the left hand, he will easily draw it out, but with his right hand he has not that power; for when drawn back it does not comply, but it either makes its escape, or it will be cut off. Tarentinus likewise says, that a serpent does not approach a person who is smeared with the juice of the plant dracontia[a], nor such persons as are rubbed with the juice or the seed of the radish; and, if they only carry them, that they are not injured; and that the root of the rose-tree saves persons bit by serpents. Florentinus says that a serpent does not approach a place where there is the fat of a stag, or the root of centaury, or gagates[b], or the herb dictamnus[c], or the fæces of an eagle, or of a kite; and being mixed with styrax[d], and a suffumigation being made, they drive away serpents. Give persons bit by serpents the juice of the leaves of the

[a] Called *dracunculus* and *serpentaria*. Matth. ii. 160 and 161.

[b] Matthiolus says that it burned with facility, and that it had the smell of bitumen; l. v. c. 103.

[c] Now called *fraxinella*; Matth. iii. 31, &c.

[d] Called *storax*; Matthiol. l. i. c. 68.

the ash to drink, those that have no fever indeed with wine, and such as have a fever with well-tempered wine, and having pounded the leaves, apply them to the wound. Apply the root of the alicacabus[e] to an asp, and it will make it sleepy. Pound tribulus[f] with water, and set the tribulus in the hole, and you will drive away the serpents. If jars, that had salted things in them, be buried in the ground about the villa, every reptile will get into them; but having carefully covered them, you are to burn them on the outside of the boundaries.

IX.—CONCERNING SCORPIONS[g].

If you take a scorpion and burn it, the others will betake themselves to flight: and if a person carefully rubs his hands with the juice of radish, he may without fear and danger take hold of scorpions, and of other reptiles: and radishes laid on scorpions, instantly destroy them. You will also cure the bite of a scorpion, by applying a silver ring to the place. A suffumigation of sandarach

[e] Pliny mentions this, xxi. 31.

[f] *Caltrops.* Diosc. attributes the same power to it, iv. 15.

[g] *Io Rhodius ad. Scrib. Largum,* 164, p. 244, has made many observations on these animals.

sandarach[h] with galbanum, or goats fat, will drive away scorpions and every reptile. If a person will also boil a scorpion in oil, and will rub the place bit by a scorpion, he will stop the pain. But Apuleius says, that a person bit by a scorpion sits on an ass, turned towards its tail, and that the ass suffers the pain, and that it is destroyed. Democritus says, that a person bit by a scorpion, who instantly says to his ass, "A scorpion has bit me," will suffer no pain, but it passes to the ass. The newt has an antipathy to the scorpion: if a person therefore melts a newt in oil, and applies the oil to the person that is bitten, he frees him from pain. The same author also says, that the root of a rose-tree being applied, cures persons bit by scorpions. Plutarch recommends to fasten small nuts to the feet of the bed, that scorpions may not approach it. Zoroastres says that lettuce-seed being drunk with wine cures persons bit by scorpions. Florentinus says, if one applies the juice of the fig to the wound of a person just bitten, that the poison will proceed no farther; or if the person bit eat squill, he will not be hurt, but he will say that the squill is pleasant to his palate. Taren-

 tinus

[h] The red arsenic of the Greek was called by this name, Matth. v. 81.

tinus also says that a person holding the herb sideritis[1] may take hold of scorpions, and not be hurt by them.

X.—CONCERNING ANTS.

If you take some ants and burn them, you will drive away the others, as experience has taught us. If you pour the gum of cedar over their haunts, ants will not come to your threshing-floor; ants will not touch a heap of corn, if you will scatter some chalky mould around the heap, or lay some wild origanum around it. You will also drive ants out of their haunts, if you burn the external coverings, that is, the shells of fish, with styrax, and having pounded them scatter them on their haunts. You will likewise drive away ants by pounding origanum and sulphur, and by scattering it round their haunts. Ants will be sure to perish, if you dissolve Cyrenaic laserpitium in oil, and pour it on their haunts. Ants will not touch plants, if you smear their stems with bitter lupines pounded with amurca, or with asphaltos pounded or boiled with oil. Ants wil not touch a vessel with honey, although the vessel may happen to be without its cover, if you wrap it in white wool, or if you

scatter

[1] See Matthiol. l. iv. c. 29, 30, 31.

scatter white earth or ruddle round it. Some mix the juice of laserpitium with vinegar, and smear the stems, and they pour it into their holes. If we bind the stems of the vines with plenty of ivy, not only the ants but the canthari[k] will be found, after a short time, under the shade of the ivy, so that they may be easily taken. Ants also are sure to perish, a smoke being made of the root of the wild cucumber, or a fumigation being made of the silurus[l], especially of Alexandria, on a gentle fire; and when one ant is removed, the others will quit the place of abode. If a person takes a grain of wheat carried by an ant with the thumb of his left hand, and lays it in a skin of Phœnician dye, and ties it round the head of his wife, it will prove to be the cause of abortion in a state of gestation. When ants are also burnt, the others will fly from the smell. I have heard how one ant carries one that is dead on its shoulders. You will keep off ants by mixing bulls gall and pitch with amurca, and smearing the stem of a plant. Red earth and pitch, mixed and rubbed on, has the same efficacy. Some hang the fish

 called

[k] Insects of the beetle kind, commonly called Spanish flies. The best are now brought to England from Italy.

[l] See Matth. ii. 26.

called *coracincus*[m] from a tree, and destroy the ants.

XI.—CONCERNING GNATS.

Horse-hair stretched through the door, and through the middle of the house, destroys gnats: and a suffumigation of calacantha[n] and nigella will not permit them to enter, and it will drive them out of the house. If you also soak a spunge in sharp vinegar, and apply it to your head, and lay it under your feet, gnats will not touch you. You will likewise drive away gnats, by soaking rue, and sprinkling the house, and by boiling conyza, and sprinkling the house with the decoction; or by making a fumigation of galbanum, or of sulphur, or of cumin. If you also lay a sprig of green hemp in blossom near you, when you are going to sleep, gnats will not touch you: and they will not approach you, if you rub yourself with manna, and vinegar and oil. They will likewise betake themselves to flight, when a smoke is raised from the sediment of vinegar and origanum. A suffumigation of cow-dung,

[m] This fish is mentioned by Martial, l. xiii. 85. *Princeps Niliacis raperis, coracine, macellis,* &c.

[n] *Syrian glaucium,* c. iv. of this Book.

cow-dung, and the application of it under the walls, will drive away the gnats: and if the upper garments be fumigated with one ounce of elicampane, two ounces of ammoniac, two ounces of styrax, two drams of burnt shells[o], they will betake themselves to flight. If a spunge soaked in vinegar be hung from the ceiling, it will bring thither all the gnats. Gnats will not torment a person in bed, when there is hemp laid under him. Soak rue in water, or boil conyza and sprinkle the house, and this will drive away the gnats. A fumigation of bdellium[p] also drives them away.

XII.—CONCERNING FLIES.

BAY pounded with black hellebore, and with milk, or with sweet wine, or macerated in hydromel, or in water, and sprinkled, kills flies: and if you pound cassia with oil, and rub yourself with it, they do not approach[q] you. But if you wish to drive them away, make a suffumiga-

 tion

[o] The original specifies the shells of *murices*.

[p] A gummy resinous juice of an eastern tree is in modern times brought into Europe from Arabia, and from the East Indies, under this name. See Matthiol. l. i. c. 69.

[q] Come upon you, in the Greek.

tion of calacantha. A decoction likewise of the leaves of elder being sprinkled, drives them away. But Anatolius says, if you wish to make them assemble in one place, make a trench, and pound rhododaphne, and pour it in, and you will bring them thither all together. Flies also will not infest cattle, if you boil the seed of bay with oil, and rub them with it: and flies never rest on dumb animals, if they are rubbed with the fat of a lion. Hellebore also, with arsenic[q], macerated in milk, or in sapa, and besprinkled, kills flies: and if you pound and rub on alum and origanum, they will not settle where this is done.

XIII.—CONCERNING BATS.

Suspend leaves of the plane-tree in their way, and they will not make their approach. A fumigation of ivy destroys bats.

XIV.—CONCERNING BUGS.

Tar and the juice of the wild cucumber applied to the bed, destroys bugs; and so does squill, when

[q] Συν αρρενικ. The arsenic of the Greeks, was what the Romans called *auripigmentum*, whence its modern name of *orpiment* seems to be derived. Matth. v. 80.

when cut in pieces and pounded with vinegar, when the bed is rubbed with it. Boil likewise the leaves of citrons with oil, and rub the joints of the beds with them; and mix bulls or goats gall with sharp vinegar, and apply it to the bed and to the walls: and this answers the end, if you pound stale oil and sulphur vivum, and rub the bed with them: and there will be no bugs, if you rub the beds with boiled glue[r] of fish. You will also destroy your bugs, if, having boiled amurca with bullocks gall, you mix it with oil, and sprinkle it over them: or you will rub the beds with leaves of the ivy, or of the capparis[s], pounded with oil, and this being applied, destroys bugs on walls. An efficacious medicament is also thus prepared: an acetabulum[t] of staphisagria[u], and an equal quantity of squill, cut in thin pieces, and a spoonful of sharp vinegar, are pounded together, they are then heated, and so the place is smeared: and you will mix one part of the gum of cedar, and four parts of sweet

wine,

[r] Pliny mentions this glue, xxii. 7. So does Dioscorides, l. iii. c. 102. Matthiolus gives an account of it, iii. 86.

[s] The caper bush now goes under this name.

[t] A little more than $\frac{1}{8}$ of an English wine pint.

[u] Called *uva sylvestris, et herba pedicularis*. Matth. iv. 150.

wine, and apply it. The gall of a goat or of a calf, and an equal quantity of white wine with vinegar, will have the same efficacy. Florentinus says, that a suffumigation of bugs destroys leeches, and that leeches destroy bugs, when the coverlid is laid on so that the unsavoury fumigation may not find its way through it: and a scolopendra[v] being dried, and a suffumigation being made with it, has the same power; and so have the leaves of ivy, and ten leeches, when they are pounded. But Democritus says, that the feet of a hare, or of a stag, hung round the feet of the bed, at the bottom of the couch, does not suffer bugs to breed: but in travelling, if you fill a vessel with cold water, and set it under the bed, they will not touch you, when you are asleep: or the pouring down of hot water, which all persons practise, indeed thoroughly destroys them, where you meet with them; but it is no preventive to a speedy reproduction of them.

XV.—AGAINST FLEAS.

Make a trench, and pound rhododaphne, and throw it in, and they will all resort there: and absinthium,

[v] There is a land and a sea animal of this denomination. Matth. ii. 14, and vi. 43.

absinthium, or the root of the wild cucumber, soaked in sea-water, and poured on, destroys them. Melanthium, also soaked in water and poured on, totally destroys them; or a decoction of the root of conyza sprinkled over them. The seed also of mustard and rhododaphne being both boiled and sprinkled over the house, likewise destroys them. Having sifted quick lime, scatter it over the place, after you have swept it, and it kills them; and so does amurca, when constantly poured on the paved floor: and by pounding and mixing with water some wild cumin, and putting in water ten drams of the seed of the wild cucumber pounded, and sprinkling it over the house, you will destroy the fleas. Or the root of absinthium and of the wild cucumber macerated in water, or the root of chamælæa[w], and the leaves of the black poplar pounded and macerated in water, or tribulus boiled in water, will do it. Strong[x] brine and sea-water being sprinkled, also destroys them. If a person also sets a dish in the middle of the house, and draws a line around it with an iron sword, and it will be better if it has done execution, and if he sprinkles the rest of the house, excepting the place circumscribed, with an irrigation of

[w] Sometimes called *oleastellum* in Latin. Matth. iv. 166, 167.

[x] Sharp brine, in the Greek.

of staphisagria, or of pounded leaves of the bay-tree, they having been boiled in brine or in sea-water, he will bring all the fleas together into the dish[y]. A jar also being dug in with its edge even with the pavement, and smeared with bulls fat, will attract all the fleas, even those that are in the wardrobe[z]. If you enter a place where there are fleas, express the usual exclamation of distress, and they will not touch you. Make a small trench under a bed, and pour goats blood into it, and it will bring all the fleas together, and it will allure those from your habiliments. Fleas may be removed from the most villous and from the thickest pieces of tapestry, whither they betake themselves when full, if this[a] is set in a vessel or in a cask.

XVI.—CONCERNING CANTHARIDES.

CANTHARIDES will not hurt the vines, if you macerate some in oil, and apply it to the whet-stone on which you are going to set your pruning-knives: and if you burn galbanum with stale cow-dung, you will drive them away: and if

[y] There is in this place a mutilated part of a sentence in the Greek.

[z] In the clothes, in the Greek.

[a] Goats blood.

if you make a fumigation of the roots of the wild cucumber, you will force them away. Aristotle also says, that the smell[b] of roses kills canthari, and that the smell[c] of perfume destroys vultures; for they say, that sweet smell is disagreeable to them. But many encompass the stems of vines, towards the ground, with a chaplet of ivy, and they find them under the shade of the ivy, and they destroy them.

XVII.—FOR LEECHES.

If an ox, or other quadruped, swallows a leech in drinking; having pounded some bugs, let the animal smell them, and he immediately throws up the leech.

XVIII.—CONCERNING FROGS.

Frogs will desist from croaking, if having lighted a candle you set it on the bank.

[b] This is mentioned by Clemens Alexandrinus, Pædagog. lib. ii.

[c] See Pliny, lib. xi. 53. *Ælianus Hist. Animal.* lib. iii. 7. Aristotle, vol. 1, p. 1166, of the Du Val edition.

BOOK

BOOK XIV.

HYPOTHESIS.

These things are contained in this Book, being indeed the Fourteenth of the Select Precepts on Agriculture; and comprising an arrangement in relation to the breeding and care of pigeons and of birds, of the aërial and terrestrial tribe, according to the information given in the subsequent chapters.

I.—CONCERNING PIGEONS.

THE raising of pigeons is of consummate utility to persons engaged in agriculture, chiefly on account of the advantage of their dung, and on account of young pigeons being necessary to the recovery of persons from illness: and the raising of them is attended with no small profit; for they are fed during two of the winter months only, and the rest of the year the bird gets its own sustenance out of doors in the fields. The bird is also naturally prolific; for every forty days it sits and hatches, and cherishes and brings up

up its young; and it does this nearly all the year: and it only ceases from the winter solstice to the vernal equinox; but the rest of the year it breeds, and you will see pigeons, whose young are not perfectly brought up, laying and sitting: and their young, when come to perfect growth, begin to lay with those that bred them. The bird indeed loves for its food the chicheling[d] vetch, the orobus, fenugreek, peas, lentils, wheat, and darnel[e], which has affinity to it. But you are to hinder them from going abroad, lest they breed in another place, and lest they be allured by thus getting out; but let them be employed in raising their young, without suffering from hunger. If they at any time want food, you are only to let out those that have young ones; for they, when satisfied, soon return, bringing sustenance to their young.

II.—THAT PIGEONS MAY NOT BETAKE THEMSELVES TO FLIGHT, BUT THAT THEY MAY BE PROMPTED TO BREED.

SMEAR the doors and the windows, and the corners of the pigeon-house, with oil of opobal-

samum,

[d] By the Greeks called λαθυρος.

[e] Ζιζανιον.

samum[f], and the pigeons will settle: and pigeons will not fly away, if you macerate cumin and lentils in melicraton[g], and throw them to them: and if you give them melicraton to drink, or if you boil lentils by themselves in sweet wine, and permit them to eat them, you will prompt them to breed. This potion[h] is also prepared, that pigeons may not fly away: shells pounded and sifted, and costus, and old well-flavoured wine, mixed together, are brought to them, before they are going out to feed: and some having well-wrought barley-meal boiled with dried figs, and having added a due proportion of honey, set it before them; others carry them cumin before they go out to feed. Pigeons will settle, if you fix the head of a bat on the tower; or if you deposit branches of the wild[i] vine with their blossoms in the pigeon-house, in the season, when they blow.

III.

[f] Matth. i. 18.

[g] A kind of mead, whether boiled or not.

[h] Love-potion, in the Greek.

[i] Αγριας αμπελου.

III.—THAT PIGEONS MAY SETTLE, AND THAT THEY MAY ALLURE OTHER STRANGE PIGEONS TO THEM.

If you rub pigeons with muron[k], they will allure others in the neighbourhood: and if you throw cumin before them, when they are going out to feed, you will also make many others come with them, being induced by the smell of the cumin: and if you take the seed of the vitex[l], and macerate it in old wine, during three days; and then take vetches[m], and macerate them in the wine, and throw them to the pigeons, and immediately let them fly; the neighbouring pigeons, from the fragrant smell, will all come into the dove-cote. You will also make the pigeons enter with facility, if you make a fumigation in the pigeon-house with sage[n] and rosemary.

[k] By the Romans called *unguentum*; Matth. i. 41. This practice is noticed by many writers; Basil, M. Epist. clxxv. p. 957, Paris; Selden *de Jur. Nat. et Gent. Hebr.* 4, 5, 6, 9. He says that persons who practised this art among the Jews were not less infamous than thieves and gamblers.

[l] Αυγος, or *ágnus castus*; Matth. i. 116.

[m] Of the sort called *orobus*; in Latin *ervum*, *i. e.* the bitter vetch.

[n] The Greek points out the larger kind.

IV.—THAT A CAT MAY NOT WORRY PIGEONS.

Lay and hang sprigs of rue in the windows and in the door-way of the pigeon-house, and in other places in it, for rue has a certain antipathy to noxious animals.

V.—THAT A SERPENT MAY NOT GET INTO THE PIGEON-HOUSE.

Serpents will not infest a pigeon-house, if you inscribe the word *Adam* on the four corners of it, and, if it has a window, on that also. You will also keep off serpents, if you make a fumigation of peucedanum*.

VI.—CONCERNING THE PIGEON-HOUSE.

It is proper to build the house in fine weather, and to secure it against the ingress of noxious animals, and to plaster it with care: and it is proper to make many holes in the walls, from the pavement to the top, which some call pigeon-

holes,

* Hog's fennel. The Greeks gave it the name of πευκέδανος, because its leaves resemble the leaves of the pine; Matth. iii. 77.

holes[p], but we give them the name of roundish cells, in which the pigeons in pairs are to settle and to breed; and you are to set before each hole a tablet, that they may get in by means of it: and you are to make them a good place for washing in the house, that they may drink and clean themselves; and that the man, under the pretence of giving them water, may not perpetually disturb the pigeons, which is consummately hurtful. But you are not totally to exclude a man from getting in, for it is necessary now and then to sweep the house, and to take away the dung; and if any thing is amiss within, to set it right, that neither serpents nor other reptiles may prove injurious to the pigeons. I indeed, wishing to preclude the access of reptiles, made choice of a proper situation, having no buildings near, but standing at a distance; and I carried columns in proportion to the size of the work that was going to be raised; and I set these, not in a straight line, but circularly: I then set capitals on the columns, and afterwards stone columns on the capitals; but

[p] Αστινας καλεσι σηκυς ημεις δε κυθρινυς ονομαζομεν. Σηκος means sometimes a place where an animal settles: and it is used to signify a stable and an ox-stall. Κυθρωυς seems to allude to a roundish form of the hole, which might have some resemblance to a caldron, which in Greek is called κυθρον.

for want of stone columns I have set strong wooden pillars, and I built on the columns a couple of cotes all around, of the height of seven cubits. And I indeed made a window in the wall from the west for light, and another window from the east; and I fixed in this, what is called lattice[q], whence the pigeons are to go out to feed: and on the south side I placed the door, for the convenience of the person who had the care of the birds: and I thus kept the pigeons unhurt, for reptiles cannot get up, the columns being so very carefully plastered and made so smooth; nor is it possible for a cat, nor for any other animal, to use its craft, there being no buildings near, from which they may be able to put their designs in execution. But it is proper that a person who wishes to raise a pigeon-house, should not begin to breed from young pigeons, but from such as have already bred. If there are ten pairs for a stock, they are soon multiplied.

VII.

[q] Καθεκτην. Varro and Columella say the house had a lattice or reticulated window. The Greek term properly expresses no more than a contrivance to let out the pigeons. The situation of the window towards the east was well adapted to call forth the birds to early feeding.

VII.—CONCERNING DOMESTIC FOWLS.

We are to breed domestic fowls in warm and well-covered houses, to which smoke has access: and we are to make nest-holes in the walls for them to lay, having their bottoms laid with board, and supplied with straw, that the eggs that are laid may not fall on a hard bottom and be broken: and it is necessary to fix perches in the walls on which the fowls may settle. You are also to give them for food boiled ptisane, or millet, or wheat gurgeons, or darnel, which is called *aira*, which are very good for nourishment, and the green leaves of cytisus[r], for these make them very prolific: and when they lay, it is proper particularly to observe that they may not eat grape-stones[s], for these render them less prolific. You are also to break hens of the practice of sucking their eggs in this manner: you are to take out the white of the egg, and you are to pour on the yolk, that is, the yellow part of the egg, gypsum in a liquid state, that it may become hard; for when they are induced to repeat the

 practice,

[r] This is also recommended by Columella, lib. viii. 4, 1.

[s] Columella and Palladius observe this, Col. viii. 4, 2; Pal. i. 27.

practice, and find nothing else, they will soon abstain from destroying their eggs. They are also particularly well fatted, and they become very plump, when fed in a dark and warm house, and their[t] pinions being plucked, and barley-meal made up with water being brought them to feed on. Others also use barley-meal and the meal of darnel, or barley, and the seed of flax with omelysis[u]. Some indeed likewise mix meal of parched barley, and some also pour wine on it. Some, soaking wheat-bread in good wine, give it them; but most persons feed them with millet. But a person who wishes to raise fowls must select hens that are the most prolific; and he learns this from use and experience, and from some other indications: as, for a general instance, those that are of a yellowish hue, and with extraordinary[v] claws, having large eyes, and a high crest; and those with black wings, and those of a large size, and those that will with facility receive the embraces of love; and they are better

for

[t] The more circumscribed these external appendages are, the more will the power of nutrition be promoted, in the same ratio, by inverse proportion.

[u] Meal of barley that had not been parched.

[v] The Greek word signifies *claws*, in number more than usual.

for laying, and they produce large eggs, from which proceeds a generous offspring. But you are not to feed more than forty hens in the hen-house, for they do not thrive when too much confined; and let a sixth part of the fowls be cocks: and you are immediately to take the eggs that are laid, and to put them in vessels with bran. When we also wish fowls to lay, we are to set clean straw under them, and to lay an iron[w] nail in it, for this seems to be of service against every evil. More than twenty-three[x] eggs indeed are not laid under a good hen, and fewer under one that is not a good one, according to the natural power of each bird: but the number must always be uneven; and you must set them under the hen when the moon is increasing, that is, after the new moon to the fourteenth day of its age: those indeed that are set before the new moon, become abortive. It is also necessary to set the eggs chiefly that were laid from the blowing of Favonius to the autumnal equinox, that is, from the seventh of February to the twenty-second of September; wherefore you are to set them apart

[w] Columella mentions the same thing, lib. viii. 5, 12.

[x] Columella recommends 21 eggs, this author 23; Varro went so far as to mention 25, which might not seem so extraordinary in a warm climate.

in the breeding-season, that a young brood may be raised. But you are not to set the eggs laid before this season or afterwards; and all the first-laid eggs are not to be set, for they are steril and imperfect. The best season indeed to set the eggs is from the vernal equinox, that is, from the twenty-fourth of the month of March; and it is necessary to set them under hens that are advanced in age, not under those that are in full vigour and able to lay: for they are in the most perfect vigour for laying when a year and two[y] years old, but such as are more advanced than this are less adapted for laying. You must indeed preclude those hens that have spurs as the cocks, from sitting, for they destroy[z] their eggs. After setting the eggs you are to put in the hens, that they may cherish the eggs during all the day and the night; but you are to open the door in the morning and evening, and you are to set before them their usual food; and then you are again to shut them in; and you are to compel such as do not get up spontaneously, to get in: and let the keeper turn the eggs every day, that they may be equally cherished on every side.

But

[y] The Greek expresses that they are more fit for laying when two years old than when only a year old.

[z] Perforate, literally.

But the eggs are distinguished, whether they are prolific, if, after they have been sit upon four days, they be examined against the rays of the sun; for if indeed any thing appears pervading the inside, and of a bloody hue, the egg will be prolific; but if it be pellucid, it is to be thrown away as unprolific, and you are to set others instead of the eggs that are disapproved. But there is no need to fear that the eggs may be addled, if they be often gently turned, for nothing then hurts them. It is also proper not to set one hen only the same day, but three or four; and you are immediately to take the chickens that are hatched, from every hen, and to set them under one that has but few: and you are to divide the eggs that are not hatched, between the hens that are still sitting, that being cherished by them they may come to life; but you are not to set under a hen that has a small brood more than thirty chickens. But cold is very inimical to the race of fowls. You will thus prove if eggs are good: put them in water, for one that is faulty swims as being useless, but that which is fully perfect will sink to the bottom; nor is it proper to shake the eggs in proving them, that the vital principle in them may not be destroyed: and as some persons set heterogeneous eggs under domestic fowls, you are

to

to know that a hen hatches the eggs of a pheasant, in the same manner as its own, in twenty-one days; but the eggs of a pea-fowl[a], and of a goose, in twenty-nine days. Calculate then, and set these according to those already mentioned, that they may be hatched seven or eight days afterwards. But there are in Alexandria, belonging to Egypt, hens called *monosyri*, from which game-cocks may be raised, which sit on two or three sets of eggs successively, so that the chickens that are hatched are taken away and bred apart, and the bird sits forty-two[b] or sixty-three days.

VIII. — HOW IT IS POSSIBLE TO PRODUCE CHICKENS WITHOUT A HEN.

You will have a number of chickens without incubation in this manner. When you set eggs under a hen that is sitting, the same day take some dung of fowls, pound it small, and sift it, and put it in pots[c], and lay hen's feathers all over

[a] Varro says, in twenty-seven days. Pliny says, from the twenty-seventh to the thirtieth day.

[b] $21+21=42$ $42+21=63$.

[c] The pots were such as were by the Romans called *cucurbitæ*.

over the dung, and on these set the eggs perpendicularly, having the sharp end uppermost; then scatter some of the same dung over these again, until they are totally covered, and let them remain two or three days, and afterwards turn them every day, taking care that the eggs may not touch each other, that they may be equally cherished: and after the twentieth day, when the hen's eggs begin to hatch, you will also find those in the pots cracked: wherefore they also set down the day on which the eggs have been set, that the number of the days may not be forgotten. On the twentieth day then take off the shell, and having cherished the chickens, put them in a basket, and introduce the hen, and she will take the management of all the chickens. That they may also have food, take some leaven of barley, and mix some gurgeons with water; and put some ass or horse dung in the pots, and after three days worms will be produced to feed the young brood.

IX.—CONCERNING THE FEEDING OF CHICKENS.

The chickens being indeed first put in a basket, are suspended over a little smoke, but they take no nourishment during two days. Se-

cure

cure the vessel, from which food is given them, with[d] cow-dung. The food they first take during fifteen days is barley-meal, macerated with cress seed with wine and water. But the house is also suffumigated with one of the things that[e] drive away reptiles. Let them be altogether under cover to the fortieth day, and you are to feed them in a very warm coop; for the cold is very inimicial to them. There have indeed been found certain antidotes, which preserve hens[f]. If rue is tied under the hen's wings, neither a cat, nor a fox, nor any other noxious animal, will touch them; and especially if you give them food with which the gall of a fox or of a cat has been mixed, as Democritus positively affirms.

X. — TO MAKE EGGS BEAR AN INSCRIPTION.

POUND galls and alum with vinegar, till they are of the thickness of black ink, and inscribe on the egg what you please; and when the writing is dried in the sun, put the egg in sharp brine; and

when

[d] Probably with a view of preparing them for the farm yard.

[e] See xiii. 8.

[f] There is a mutilated sentence after this, which some have tried to restore from Pliny, l. xxx. 15, 50.

when it is dry, boil it; and when you have removed the shell, you will find the inscription. If you also cover an egg with wax, and draw[g] characters on it, so that the shell may appear as if engraven, and then permit it to be macerated in vinegar for a night; the following day you may remove the wax, and you will find the shape of the characters become transparent by the vinegar.

XI.—THAT HENS MAY PRODUCE LARGE EGGS; AND CONCERNING THE KEEPING OF EGGS.

You will make your hens produce large eggs, if you pound the Lacedemonian[h] shell, and mix it with bran, and having wrought it with wine, give it the hens: or mix an acetabulum of the pounded shell with two chœnices of bran, and give it them to eat. But some, wishing their hens to lay large eggs, reduce red earth[i] to a state of solution, and mix

[g] The characters were probably drawn with the stylus. This method seems to have had some kind of analogy to the modern invention of engraving with aqua-fortis.

[h] Supposed by some to have been the shell which produced the Lacedemonian purple, which was so much valued after the Tyrian sort.

[i] Called μιλτος.

mix it with their food. They will not become abortive, if you roast the white of an egg, and pound an equal quantity of dried grapes, that have been toasted, and set them before the hens, before their other food. Some also afford the coops, and the nests, and the hens themselves, a lustration with sulphur, and asphaltos, and torches of the pitchy pine. Some also lay a plate of iron, or the heads of nails, and branches of the bay-tree in the nests, for these seem to be of use[k] against thunder. You will also keep eggs indeed in chaff in the winter; and in bran in the summer. Others likewise wash the eggs with water and fine salt, and cover[l] them, and so keep them. Some also lay them in warm brine three or four hours, they then take them out, and lay them in bran or in chaff; but a certain portion of those that are laid in brine or in salt, is wasted. You will distinguish a sound egg, and one that is not so, by putting it in water; for that which is imperfect will swim, and that which is sound will sink to the bottom.

XII.

[k] Literally, alexipharmics or amulets.

[l] With water and salt, which the Greek implies, were so mixed that the water was thick with the quantity of salt.

XII.—THAT A HEN MAY NOT CATCH COLD.

HAVING macerated origanum, give the bird the liquor to drink: or wash it with urine; or rub its[m] bill with garlic; or put this in water, and give it the hen to drink.

XIII.—TO MAKE HENS VERTIGINOUS.

HAVING mixed laser with honey macerate wheat, and throw it to them.

XIV.—THAT HENS MAY NOT PROVE ABORTIVE.

A HEN will not prove abortive, if you roast the yolk of an egg, and pound an equal quantity of dried grapes that have been toasted, and give it the bird before her other food.

XV.—THAT HENS MAY NOT BE HURT BY A CAT.

A CAT does not touch a hen, if wild rue be suspended under its wing.

XVI.

[m] Its nostrils, in the Greek.

XVI.—CONCERNING COCKS.

It is proper to choose the fiercest cocks: and this is understood from use and experience, and from certain other indications; for the best cocks are of a compact size, and they have a crest of crimson hue, and a short beak; and they have a good[n] countenance, and black eyes; and they have wattles of rosy colour, and a compact[o] neck; and they are of varied colours, and their legs are scaly[p], rather stout than long; and they have strong spurs with sharp points, and large and thick tails. Let them be also fierce, and apt to crow, and resolute in battle; and let them not indeed be the first to begin the contest, but let them valiantly repel their aggressors; and let them not fly from noxious animals, but let them keep them away from the hens. You are also to give the cocks the seed and the moist leaves of cytisus, having soaked them in water, for they are no less nutritious to them than the leaves that are green.

XVII.

[n] The goodness of their sight seems to have come under this expression, according to the Greek.

[o] Well set, is the Greek epithet.

[p] This epithet in Greek is often applied to serpents.

XVII.—CONCERNING THE VARIOUS CURES OF HENS.

You will cure a hen's eye by rubbing the exterior part of the eye with the milk of a female, or with the juice of purslain, or with sal ammoniac, or with cumin and honey, having pounded an equal part of each, and having likewise applied them. Confine the bird also in a shady place. You will also cure a looseness by mixing a handful of barley-meal[q] and an equal quantity of wax, and by making them of due consistence, and administering them before the other food; or by giving the bird a decoction of apples, or of quinces, to drink: and these being roasted are of service. You will also cure a hen of the *morbus pedicularis*, by pounding an equal quantity of parched cumin and staphisagria[r], and by washing the bird with wine; and wash it with wild lupines boiled in water. Foul water gives a hen cold; it is therefore proper to give it clean water. You will also cure a cold by cutting garlic into small pieces, and throwing them into warm oil; then cool it, by washing the bird's mouth: and if the

[q] Of the kind called αλφιτον.

[r] The French call this *herbe aux-poux*.

the hens eat it, they will be the more speedily cured. Staphisagria also by itself, or mixed with orobus, is useful: and clean squill soaked in water, and then administered with barley-meal, has this effect. But if hens have a more than ordinary cold, they are lanced under the gills, and the parts about the eyes are pressed, and the wounds are rubbed with fine salt. Some also make a suffumigation of origanum, and hyssop, and thyme, holding the bird's head over it; and they rub the beak with garlic. Some likewise boil garlic in human urine, and carefully rub the beak with it, so as not to touch the eyes.

XVIII.—CONCERNING PEACOCKS.

PEACOCKS are chiefly bred in factitious islands[s]: but let the place have abundant plenty of grass, and an orchard: and you are to separate those of a generous breed from those that are weak; for those that are strong oppress those that are feeble. The hens indeed, when they are three[t] years old, breed; but they that are younger, either do not hatch, or do not feed the young fowls. You

[s] Palladius says they were more secure from the fox in such a situation.

[t] Pliny says the same thing, l. x. 59.

You are also to give peacocks for food, during the winter, beans parched on a coal fire, and before their other food, six cyathi to each bird; and you are to set clean water for them, for they will thus be more prolific: and you are to spread hay or straw in the house for them that lay, that the eggs, when they drop, may not be broken; for they drop their eggs standing, and they do this twice in the year, but they have not more than twelve eggs in all. But it is proper to set the eggs when the moon is nine days old, nine in the whole, five of its own, and four of the domestic fowl: and you must take away those of the domestic fowl on the tenth day, and set others, that the hens eggs may be hatched on the thirtieth day with those of the pea fowl. It is not proper indeed to give the young brood, that is hatched, food the first two days; but on the third day we carry them barley-meal made up with wine, and gurgeons[a] dressed and boiled, and the tenderest leaves of leeks pounded with green cheese. But let barley be given them after six months.

[a] Πιτυρον, bran.

XIX.—CONCERNING PHEASANTS, AND NUMIDIAN FOWLS, AND PARTRIDGES, AND FRANCOLINOS.[v]

You are indeed to bring up these birds also in the same manner as we have informed you peacocks are raised. Being confined, they are also fatted, so that they may receive no nourishment the first day; but on the following day you are to give them hydromel or wine, and barley-meal mixed with water for food; and you are to give it them gradually, and you are to set a little at a time for them: then boil ground beans, and ptisane, and whole millet, and linseed, and so mix them with barley-meal, and add some oil to them, and make them into pellets; and carry them this food till they are satisfied. Some indeed also give them fenugreek for five or six days, being desirous to rid the birds of bile, and to purge them. They are fatted in sixty[w] days at the farthest. These kinds of birds are also

cured

[v] The Roman and Greek name of this bird is *attagen*, by some supposed to be the *lagopus* of Pliny, lib. x. c. 48. The Italians call it *francolino*. See Edwards's birds, plate 246.

[w] The manuscripts differ in respect to the number of days. In some the number is ζ, and not ξ.

cured by the prescriptions already mentioned with respect to domestic fowls.

XX.—CONCERNING PARTRIDGES.

PARTRIDGES have by nature a very ardent desire for copulation; whence the cock birds, prompted by jealousy, contend with each other for the female birds: when therefore there are found two cocks among the hen birds, they immediately engage, and the contest is no sooner ended, before one of them, being overcome, withdraws: then all the female birds in future follow that which appears to be the master bird; and this, being elated, treads the bird that is overcome, and he will afterwards follow the victor in the train of his female attendants.

XXI.—CONCERNING THE TAKING OF PARTRIDGES AND OTHER BIRDS.

YOU will easily take partridges, if you macerate barley-meal in wine, and lay it for them. You will also take any bird with ease, if you set wine mixed with water in vessels for it, the potion being strongly impregnated with wine: for

when they drink a little of it, they become quite sleepy, and do not fly from their pursuers.

XXII.—CONCERNING GEESE.

You are to choose the largest and the whitest geese; and you are to make your goose-pen in a grassy and watery situation; and you are to give them all kinds of pulse for food, except the orobus: give them also the leaves of lettuce*; but you are to preclude them from eating agrostis, for it becomes the cause of indigestion. They lay three times a year, twelve eggs, and sometimes more; and some of these you are to set under hens. The goslings must remain within the first ten days; but when it is fine weather, let us drive them to pasture; and we are to drive them to water when they are well fed; and we are to see that they are not stung with nettles, or any thorn. We are likewise to take care that they do not swallow the hair of a kid or of a hog, for when they swallow it they die. When the goslings are first hatched, soak meal of parched barley, wheat, and green cresses, and feed them. Geese are fatted in warm pens, with two parts

of

* This is recommended by Columella, viii. 14. 2.

of barley-meal, and four of bran, mixed with hot water, and thrown to them, to eat as much as they wish. They eat three times a day, and about midnight; and they drink plentifully. After they are grown to a good size, cut dry figs into small pieces, and mix them with water, and give it them to drink for twenty days. It is also necessary to mark the eggs of each goose with some characters, to set these under the right goose, for this race does not cherish the eggs of other geese. You ought likewise to set nine eggs under a goose, or eleven, but not less than nine. The bird sits mostly during nine-and-twenty days, but when the weather is cold, thirty; but during the days it sits, you are to set before it barley soaked in water. If a person wishes to make their livers[y] large, after thirty days let him cut dry figs into small pieces, and let him mix them with water, and let him administer them during twenty days, or seventeen at least. But some, to make the liver large, and to make the goose fat, feed it in this manner: having confined it, they give it macerated wheat, or barley thus prepared; for wheat soon fattens, and barley

 makes

y The fatted livers of geese and swine made part of the luxury of the Greeks and Romans. See Pliny, viii. 51, 77; and x. 22. 27. Horace, Ser. 2. 8. 88. Martial, xiii. 58. Palladius, i. 30. Plin. Ep. ii. 6.

makes the flesh white. Let the bird then eat one of the sorts already mentioned, or both, for five-and-twenty days; then bring it seven collyria[z] a day, for five days, and let the number be increased to fifteen, so that all the days may be thirty; and when fifty days are expired, boil some mallows, and soak some leaven in the decoction while it is hot, and exhibit it, and do this during four days. Offer the bird also melicraton on those days, changing it thrice every day, and not using the same; and the six following days, cut dry figs in small pieces, and administer them with the leaven already mentioned; and thus, after sixty[a] days, you will have the liver tender and white, which, when taken out, you must put in a large vessel, having warm water, which you must change twice[b] or thrice. The flesh and livers of the female birds are the best. Let not the geese be a year old, but from two to four years of age.

XXIII.

[z] They seem here to signify what are called pastils, or troches. They were pellets made in the form of collyria for feeding the bird.

[a] 25 + 5 + 20 + 46 + = 60.

[b] Twice and thrice, in the Greek.

XXIII.—CONCERNING DUCKS.

Some call ducks by[c] one appellation, some by another. But you are to breed them within well-raised fences, that they may not fly away. You are also to raise agrostis in the middle of the place that receives them; and you are to throw their food into the canal, as wheat, or millet, or barley, or refuse of grapes, mixed with them; and sometimes *locustæ* also, or *squillæ*[d], and other water and river fish, similar to these, which they have been accustomed to have. Some persons indeed, wishing to have them more tame, look for their eggs about ponds, and set them under hens, and they feed them, and they will have them tame. An abundant quantity of food fattens these, as it does most other birds: and if a person observes the place where they drink, and having thrown[e] out the water puts in black wine, they

[c] They were called *νηκτα* and *νησσαι*. The first might possibly be the original name; but when this race was tamed, the female birds being so useful in incubation, gave their name to their kind.

[d] Matthiolus describes these fish, lib. ii. c. 10. The name is now given to the white shrimp on the coasts of Kent. *Locusta* is mentionedby Pennant, class v. 34.

[e] Turned out, in the Greek.

they drink it, and fall, and are easily taken. The lees of wine will have the same effect.

XXIV. — CONCERNING TURTLE-DOVES, AND QUAILS, AND THRUSHES, AND OTHER SMALL BIRDS.

TURTLE-DOVES are indeed fatted with millet and panic, and plenty of drink; and they delight in a place adapted to them, and in water. Quails also feed on millet, wheat, darnel, and clean water: but as quails feeding on hellebore[f] are pernicious to the persons that eat them, causing convulsion[g] and giddiness, you are to boil millet along with them: and if a person having eaten them be taken ill, let him drink a decoction of millet. Myrtle berries also have the same effect; and these are of great utility against poisonous mushroons. Millet possesses likewise another physical power, of use to the human race; for if a person previously eats bread made of millet, he will not be hurt by poison. Thrushes are also

fed

[f] See Pliny, x. 23. Aristot. *de Plant.* i. 5. Galen *de Therm.* i. 4, &c.

[g] Avicenna says, that the persons that eat them are in danger of falling into convulsions and spasms.

fed in a warm building; and you are to fix perches in the walls of the little edifice, and you are to set branches of the bay, or of some other tree, in the corners: and their food is placed on a clean part of the pavement, that is, dry figs macerated in water, and pressed, and mixed with wheat or barley-meal, and myrtle berries, and the fruit of the lentisc, and ivy berries, and the seed of the bay, and the fruit of the olive, and such things. But millet and panic, and very clear water, will make them fatter[h]. The small birds are also fatted with millet and panic, and baked spelt soaked in clean water.

XXV.—CONCERNING JACK-DAWS.

You will drive away jack-daws, if having taken one you hang it up; for the rest, seeing this, will fly away, suspecting that there are snares in the ground. You will also preclude jack-daws, and every other bird, from coming into your grounds, if having macerated black hellebore in wine with barley, you throw it to them. You will also act prudently, if, before they settle on your land, you keep them off with some noise; and

[h] These may possibly be the *miliariæ* mentioned by Varro, iii. 5.

and the noise from the crotala,[i] and from the[k] bull's hide, is sufficient to frighten them.

XXVI.—CONCERNING VULTURES.

ARISTOTLE says, that vultures die from[l] the smell of perfume, and canthari from the smell of roses, for an unsavoury smell is salutary to these; and that vultures do not copulate, but that they fly with their heads against the south wind, and become prolific, and that they produce their young after three years.

[i] They were musical instruments made of two round brass plates, which were played on by striking the one against the other. Cæl. lib. xix. c. 4.

[k] It is possible that the τυμπανα of the Greeks were mounted with this skin.

[l] See Sext. Empir. Pyrrh. Hyp. 1. 14, 55. p. 16.

BOOK

BOOK XV.

HYPOTHESIS.

These things are in this Book, being indeed the Fifteenth of the Select Precepts of Agriculture, and comprising natural sympathy and antipathy; and concerning the care of bees, and the making of honey; and that a person may not be stung by bees or wasps; and concerning the destroying of drones.

I.—CONCERNING NATURAL SYMPATHY AND ANTIPATHY.

NATURE has found many things having sympathy and antipathy in respect of each other, as Plutarch says in his second book of his Convivial Tracts[m]. I have therefore deemed it necessary to arrange the most wonderful of these in this treatise of mine; for I have taken pains that not only the lovers of agriculture should collect what is useful from my labours, but that my discourse should be likewise adapted to the lovers of literature.

[m] Sympos, ii. Quest. vii.

rature. You must know then that an elephant[n] in consummate fury becomes tame at the sight of a ram; and that he abhors the grunting of a pig. A wild bull[o] becomes composed and gentle when tied to a fig-tree. A horse[p] bit by a wolf will be a good and a swift one; and sheep bit by wolves have their flesh of a sweeter flavour, but their wool[q] produces vermin: these things are indeed mentioned by Plutarch. Pamphilus also says, in his Treatise on the Philosophy of Nature, that horses treading[r] in the steps of wolves become torpid in their limbs; and that a wolf, when he touches a squill, becomes spasmodic, for which reason foxes lay squills in their holes on account of the wolves. A wolf, if he[s] first sees a man, renders him feeble and speechless, as Plato says in his Treatise on Politics: but when the wolf is first seen by the human creature, his powers desert him. A lion treading on the leaves of the holm-oak becomes motionless: he also dreads a cock and his crowing; and if he sees him, he flies away.

[n] Plutarch mentions this. Symp. lib. ii. p. 641.

[o] See Pliny, xxiii. 7. 64.

[p] This is taken notice of by Plutarch, Prob. viii.

[q] See Pliny, xi. 33.

[r] Anatolius, p. 300.

[s] Virgil takes notice of this, Ecl. ix. 54.

away. A hyæna, by some natural instinct, when it treads on the nocturnal shade of a dog, formed by the moon, lets itself down from a height as if by a rope. And Nestor says in his Panacæa, that a hyæna, when it sees a man[t] or a dog asleep, lays its body along the creature that is asleep; and if it indeed finds itself of a greater size than the creature that is sleeping, it naturally, from its length, renders it delirious[u], and it feeds from[v] its hands without any reluctance; but if it perceives itself to be shorter than it, it runs away with the utmost speed. When a hyæna advances towards you, beware lest it come upon you from the[w] right side, for you will become motionless, and you will not have the power to help yourself: but when it comes upon you from the left side, attack it with confidence, for you will be sure to kill it. If a person holds the tongue[x] of a hyæna in his hand, he will have the surest protection against

[t] This is mentioned by Aristotle, *Mirabil. Auscultat.* and by Ælianus, iii. 7.

[u] This alludes to the paraphrenesis, which was a temporary madness.

[v] This can only refer to the human creature.

[w] See Pliny, lib. xxviii. 8; and Æli. vi. 14.

[x] See Pliny, lib. i.

against the attack of dogs. If the polypus[y] approach a crab, it casts its claws. When there is a fumigation of ivy, bats perish. Vultures perish from the smell of perfume. A serpent dies, when leaves of the oak are thrown upon it. A serpent will not stir, when a quill of the ibis is thrown at it. A viper, being once struck with a reed, becomes motionless; but repeatedly, it gathers strength. If you apply a branch of the beech to a viper, it is intimidated. If a testudo[z] eats serpents, it becomes sick; but when it eats origanum, it is convalescent. Storks lay leaves[a] of the plane-tree in their nests, on the account of bats. Swallows lay in parsley, on account of beetles[b]; ring-doves lay in bay; the circi[c], lettuce; the harpæ[d], ivy: crows lay in agnus[e]; the upupæ[f], amianthus; ravens, vervain;

[y] See Pliny, lib. ix. c. 30. This in the original is very ambiguous; Vitelli has translated it *polipody*, after the Latin.

[z] See Aristotle, H. A, ix. 6; Æli. iii. 5; and vi. 12.

[a] Anatolius takes notice of this, p. 298.

[b] This animal is called *blatta*, in Latin and Italian; Matth. lib. ii. 35.

[c] Κίρκοι. See Ælianus, i. 35.

[d] See Alciat. in Emb. *Altivolam milvus comitatur degener harpam.*

[e] The vitex of the Romans came under this name.

[f] See Pliny, x. c. 29.

vervain; larks lay in agrostis, whence the adage,

In the lark's nest is the perverse agrostis laid.

Thrushes lay in myrtle; the partridge, the tops of reeds; the ardea[g], a crab: the eagle lays in maiden-hair.

Theophrastus and Aristotle say, that animals are not only generated one from another, but that they are spontaneously produced, and that they arise from putrid mould, and that some animals and plants are changed into others: for they say that the caterpillar is changed into another winged creature, called the butterfly; and that the worms from the fig-tree are changed into cantharides; and the hydrus[h] into a viper, when ponds are dried. It seems also, that some animals are transformed according to the seasons; as the hawk is changed into the upupa; and as the erithacus[i] and the summer phœnicuri[k] are transformed in the same way as the ficedula and the melancoryphi are metamorphosed; for it is the

[g] Ερωδιος. The heron and other birds come under this name; Pennant, class ii. 173.

[h] The Latin name of this was *natrix*; Matth. l. vi. c. 51.

[i] It was the *rubecula* of the Romans.

[k] The *ruticillæ* of the Romans.

ficedula about autumn, and immediately after the vintage it becomes a melancoruphos[l]. If sea-birds are hurt in their beaks, they are cured with origanum. A radish, when laid on a scorpion, kills it. If a person stung by a scorpion sit in an erect posture on an ass, looking towards its tail, the ass will suffer for him, and it gives an unequivocal proof of it. If a person stung by a scorpion says to the ass, "A scorpion has stung me," he will suffer no pain, it being transferred to the ass. Ants, that the wheat accumulated by them may not grow, eat the interior part of the grain. The seeds that, in sowing, touch the horn of the ox, are not affected by fire; and these are called *kerasbola.* The magnet, or sideritis, attracts iron; but it is divested of this power, when rubbed with garlic: it recovers its power, if the blood of a goat is poured upon it. Amber, or succinum, attracts to itself chaff and all light things, except basil. There are two sorts of ætites[m]; the one indeed is dense and solid, the other rarefied and light; but that indeed which is solid, being tied to females, promotes the growth of the fœtus. Coral in a house keeps off all violence and treachery; and shoots of ebony have

[l] *Atricapilla* of the Romans.

[m] See Pliny, 36, 39. This is, in English, called eagle-stone.

have the same effect, as well as the roots of aspalathus[n], and the sweet-scented anagallis[o], and dried squill, lying in the vestibule of a house. A fumigation of the stone called *gagates*[p], drives away reptiles; and this stone, when besprinkled with cold water, and brought to the fire, burns with much splendor, as Nestor says in his Panacæa; but when oil is poured on it, it ceases to burn. Amianthus is superior to the power of fire, and it is not burnt, although it should remain a long time in the fire. The salamander[q] likewise, a very small animal, is produced from fire, and it lives in fire, and is not consumed by its flame. Bulls, when their nostrils are rubbed with a preparation of roses, become vertiginous. A he-goat will not run away, if you cut his beard.

II.—CONCERNING BEES, AND HOW THEY MAY BE PRODUCED FROM AN OX, WHICH IS CALLED BOUGONE.

THE place in which the bees are to be, ought to be turned to the aspect where the sun rises.

[n] Matth. l. i. c. 19.

[o] See Matthiol. l. ii. c. 174.

[p] Matthiol. l. iv. c. 103.

[q] Matthiol. l. ii. c. 56, gives an account of this animal, as do *Acta Eruditorum*, for 1667.

in the winter or in the spring, that they may be cherished in the winter, and that the vernal air, blowing on them, may refresh them. The best water for the bees is that which runs through rough gravel, clear and not turbid; for it renders the bees healthy, and it makes good honey. But it is proper to set pebbles and stones, and wood, rising a little above the water, that they may rest upon them, and drink at their ease: and if there is no spring-water, you must draw water out of a well into clean vessels[r] or cisterns[s], and let them be near the bees, that they may not be fatigued in going to water. They are very fond of thyme; and when they are well fed with it, they make the greatest quantity of honey, and they breed well. Sage also, and thymbra, and cytisus, are very grateful food to bees, and the fresh swarms are very apt to pitch on cytisus, and they receive nourishment from it without much labour. But the best hives, that is, the vessels to receive the bees, are made of boards of the mountain ash, or of the fig-tree, and of the pine likewise, and of the beech. Let the breadth of them be a cubit, and the length two cubits; and let them be covered on the outside with a preparation of plaster

and

[r] Press-vessels, in the Greek.

[s] Fountains, in the Greek.

and cow-dung; for they will be less apt to rot. It is also proper to perforate them obliquely, that the air gently blowing, may dry the cobweb and other obstacles, and that it may refresh the bees. But this animal delights in a solitary situation, and it detests the approach of human creatures; for which reason, the bee-keeper must build a wall of hollow stones around them, that they, flying into the holes, may have the power to escape the birds that lie in wait for them, and the dew. They are attached to their accustomed pastures, and they do not willingly come into strange grounds: for which reason it is proper to keep them in the same place. But if it be necessary for a purchaser, or for some other reason, that they should be removed, let the person tie the hives, in the night, carefully in leather[t], and let him take them away before day; for in this private manner he wlll neither disturb the combs, nor harass the bees. When they indeed feed on spurge, and taste its juice, they contract a looseness[u]; it is therefore proper to remove and to extirpate that which grows near them, and to cure them with the rind of the fruit of the pomegranate, that is, with the integument; having

[t] Skins, in the Greek.

[u] Diarrhœa, in the Greek.

having pounded it, and sifted it through a fine sieve, having mixed it with honey and with rough wine, and having set it for them. You will also cure them of vermin, by burning branches of the apple-tree, and of the wild fig-tree, and by making a suffumigation. You will likewise cure them of dimness of sight with the smoke of the leaves of origanum. Now, as bees produced from an ox come to life on the one-and-twentieth day, so are swarms produced in the same number of days. The kings indeed are found in the upper parts of the combs: and it is proper to leave one in every hive, and to destroy the rest; for the bees being divided between them, raise a sedition, and they desist from their work. The best indeed of the kings are those of a yellow colour, of a size larger than that of a bee by the half; the second are those that are variegated, rather of a dark colour, of double size. But it is proper to remove from the place spurge, and hellebore, and thapsia[v], and absinthium, and the wild cucumber, and all things that are pernicious to the bees; for they indeed make bad honey, and they take it from these. You will also destroy creatures that lie in wait for them; and they are

wasps,

[v] See Pliny, xiii. 22; and Dioscorides, l. iv. Matth. iv. 151.

wasps, the titmouse[w], the bee-eater[x], swallows, crocodiles[y], and lizards; and drive away and destroy all things that are pernicious to the bee. They indeed become unmanageable at the approach of human creatures, and they fall upon them, and they are more severe on such as smell of wine, and of perfume[z]; and they fall upon women, especially upon such as are of an amorous complexion. But let the hives in which the bees are, be carefully rubbed with the choicest thyme, or with the white poplar: and that they may like their hives and remain in them, pound an equal quantity of nard and myrrh, and mix them with a quadruple proportion of honey, and you are to rub the hives with these. Iobas, king of Libya, says, that bees might be raised in a wooden coffer: and Democritus[a], and Varro, in the Roman tongue, say that bees are to be raised in a house, which is much better; and the method is this: let there be a building ten cubits high, and of the same number of cubits in breadth, and

 of

[w] In Greek, αιγιθαλος; in Latin, *parus*; in French, *mesange*.

[x] In Greek and Latin, *merops*.

[y] Matth. iii. 10.

[z] Varro, iii. 16. Columella, 9. 14. 3.

[a] Columella says this ought to be done, from the summer solstice to the rising of the dog-star, 9. 14.

of equal dimensions[b], at all sides, and let there be one entrance, and four windows made in it, one window in each wall: then bring into this building a bullock, two years[c] and a half old, fleshy, very fat: set to work a number of young men, and let them powerfully beat it, and by beating, let them kill it with their bludgeons, pervading the bones along with the flesh: but let them take care that they do not make the beast bloody (for the bee is not produced from blood), not falling on with so much violence with the first blows: and let all the apertures be stopped with clean and fine cloths dipped in pitch; as the eyes, and the mouth, and such as are formed by nature for necessary evacuation: then, having scattered a good quantity of thyme, and having laid the bullock on it, let them immediately go out of the house, and let them cover the door and the windows with strong clay, that there may be no entrance nor vent to the air, nor to the wind. The third week it is proper to open the building

[b] The building was a cube; that is, the six sides consisted of an equal number of cubits, and the angles were right angles.

[c] Thirty months, in the Greek. This method of raising bees is mentioned by many of the ancient writers. Ælianus *de animal.* l. ii. c. ult. Virgil. *Georg.* iv. 550.

building on all sides, that the light and pure air may be admitted, except the side where a strong wind blows in; for if this be the case, it is proper to keep the windows[d] shut on this side: but when the materials seem to be animated, having attracted a sufficient portion of air, it is again proper to secure the building with clay according to the former method: having then opened it on the eleventh day after this period, you will find it full of bees crowded in clusters on each other, and the horns, and the bones, and the hair, and nothing else of the bullock left. They say indeed that the kings are produced from the brain, but the other bees from the flesh. Kings are also produced from the spinal marrow. But those that are produced from the brain are superior to the others in size and beauty, and in strength. But the first change and transformation of the flesh into living creatures, and as it were a conception and birth, you will thus know; for when the building is opened, you will see things small and white in appearance, and like one another, and not perfect, nor yet such as may be properly called living animals, in great number about the bullock, all indeed motionless, but gradually increasing in size. You may then see the form of the

[d] Entrance, in the Greek.

the wings with their divisions, and the bees assuming their proper colour, and seated around their king, and flying, but to a small distance, and with tremulous wings, on account of their want of practice, and the debility of their members. They also settle on the windows with a murmuring noise, impelling and forcing one another, from the desire of approaching the light. But it is better to open and to shut the windows every other day, as it has been intimated; for it is proper, lest they change the nature of the bees, from longer confinement; for when the dwelling receives no air, the bees perish as from suffocation. Let the apiary be near the house; and when the bees fly out, when the windows are opened, make a suffumigation of thyme and of cneorum[c]; for by the smell you will draw them into the apiary, being attracted by the fragrance of the flowers; for when you make a fumigation of these things, you will easily bring them in; for bees like fragrance and flowers, which, as they fabricate honey, they ought to do.

III.

[c] See Matthiolus, l. i. c. 13; and Pliny, xxi. 9.

III.—CONCERNING BEES.

The bee is the most sagacious and the most skilful of all[f] animals, and it approaches man in point of understanding; and its work is truly divine, and of the greatest utility to the human race: and the polity of this animal resembles the institutions of communities perfectly well managed; for they make excursions under their commander, and by his orders: and carrying the most glutinous substances from flowers and from trees, they cover the ground[g] plot and the entrances with these, as with unguent; and some make honey, and others do something else. It is likewise an extraordinarily cleanly[h] animal, settling on nothing that has a disagreeable smell, and that is impure; nor is it given to excessive feeding; nor does[i] it approach flesh, or blood, or any thing that is fat, but such things only as have an agreeable flavour; nor does[k] it injure the labours of others, but resists with all its might

those

[f] Of all other animals, in the Greek.

[g] The Greek implies that it was tesselated.

[h] Varro, iii. 16. Palladius, i. 37.

[i] Aristotle, lib. i. and iv. 8, and viii. 11.

[k] Aristotle, lib. i. Æli. v. 11.

those that use their efforts to destroy its own labours; and, conscious of its want of strength, it makes a narrow and sinuous entrance into its hive; the bees therefore standing round, easily destroy a number entering to do them injury. Proper harmony is also grateful to this animal; for which reason, bee-masters bring them together by means[1] of cymbals, or by clapping their hands with just adaptation. This animal alone seeks a leader, that takes care of the whole swarm; it therefore always honours the king, and it accompanies him with alacrity, wherever he takes his station, and it supports him when he is fatigued, and it carries and protects him when he cannot fly. But it consummately hates the slothful; and they[m] therefore take the slothful and kill them. Its mechanical skill indeed seems to make a very near approach to a rational understanding, for it makes hexagonal cells.

IV.—THAT BEES MAY NOT FLY AWAY.

Bees will not betake themselves to flight, if you will cover the entrances into the hives with the

[1] Varro, lib. iii. 16.

[m] This transition is according to the original.

the fæces[n] of a heifer: and when a swarm is pitched and settled, take the king and[o] cut the extremities of his wings; for while he remains within, the bees will not relinquish the hive. The bees will not run away, if you pound the leaves of the wild and of the reclaimed olive, and rub the hives[p] towards the evening, or if you wash the standings[q] and the hives with melicraton. It is also proper to set food before the young swarms, œnomel, in troughs[r] having leaves and plenty of flowering thymbra, that they may not be drowned. But some pounding dried grapes together, and mixing a little thymbra with them, and laying them in pellets, feed the swarms in the best way possible, when the bees remaining in the hives are hungry through the winter's cold, or the summer's heat. When the vernal days are past, having driven them to their pastures, by a fumigation of dry cow-dung, you are to clean and sweep the hives; for the stink-

ing

[n] The original is too accurately expressive of the quality of the fæces.

[o] Pliny says the same thing, lib. xi. c. 17.

[p] Swarms, in the Greek.

[q] Walls, in the Greek.

[r] Boats, in the Greek.

ing smell of common dung brings on them a listlessness, and cob-webs embarrass them. If there are indeed many combs in the hives, it is proper to take the worst, lest the bees become unhealthy for want of room. It is not proper to take more than two swarms from one hive; for the bees will be poor and debilitated.

V.—WHEN IT IS PROPER TO TAKE THE BEES.

THE best time to take the honey and the wax, is at the rising of the Pleiades; and, according to the Romans, about the beginning of the month of May: the second taking is when the autumn begins; and the third, when the Pleiades set, about the month of October: not however on set days, but according to the perfection of the combs; for if it is taken before they are wrought, the bees take a dislike to their habitation, and being thirsty, they cease from working. They also do the same, if you greedily take away all the stock, and entirely empty the hives: for you ought to leave the tenth part for them in the spring, and in the summer; but in the winter you ought to take a third part, and to leave two parts; for they thus will not despond, and they will have food. It is likewise proper to

drive

drive them out with the smoke of cow-dung, or of the wild mallows[*], which they call *dendromalache*[†]: and the taker ought to be rubbed with the juice of this, on account of the stings of the bees: and baum, and the flower of the lentisc, are useful on this occasion.

VI.—THAT THE HONEY-TAKER MAY NOT BE STUNG.

HAVING poured the juice of wild mallows with oil on the meal of parched fenugreek, and having made it of the consistence of honey, rub your face and the naked parts of your body strenuously; and having swallowed some of it, breathe into the hive three or four times: and having set fire to some cow-dung in a pot, and having brought it to the entrance into the hive, permit the smoke to break in during half an hour, and take and hold the pot at some distance, that the smoke may abound on the outside; and so take the bees. If you likewise wish to take wasps nests, prepare yourself in this manner, mixing the meal of fenugreek with oil, &c.

VII.

[*] The original mentions, that the plant is of the male kind.

[†] The mallow-tree.

VII.—CONCERNING HONEY, AND THE MANAGEMENT OF IT.

The Attic honey is the best; and of the Attic, the Hymettian[u]. That also which is made in islands, is good. The Hyblæan[v] is the best of the Sicilian honey; and the Acramamorian[w], of the Cretan honey; and the Chutrian, of the Cyprian; and the Calumnian is the best of the Coan honey. Let it also be pellucid, and of a yellowish hue, and mellow, when touched; and when drawn, let it remain long coherent; and when taken up, let it come down gradually, and ending in a very small point; and when it is gently drawn, let it be taken up of due consistence; and let it be of an agreeable smell. But as all honey becomes dry in length of time, the Attic honey remains in a liquid state, and it becomes of a blackish colour. Be sure then to boil the inferior honey, for it will be better; but eat the best honey in its crude state; for it is not only pleasant to the persons that

[u] What was made on Mount Hymettus, on the west of the river Asopus.

[v] Hybla was a mountain near Syracuse.

[w] Supposed to be made near the promontory of Samonium, on the eastern side of Crete.

that use it, but it also makes them long-lived; such persons therefore as are fed with honey with bread only, live a very long time; and it preserves all the senses perfect. Democritus being indeed asked, how men might become healthy and long-lived? said, "If they supplied the external parts of the body with oil, and the internal parts with honey." If the honey will be genuine, you will know by touching it; for when it is not adulterated, you[x] will not soil yourself by touching it.

VIII.—THAT SWARMS OF BEES, OR FIELDS, OR HOUSES, OR STALLS OF CATTLE, OR WORKSHOPS, MAY NOT BE AFFECTED BY ENCHANTMENT.

Dig in the hoof of the right side of a sable ass under the threshold of the door, and pour on some liquid pitchy resin, (and this is produced in Zacynthos[y], out of a pond, as the asphaltus is thrown up in Apollonia[z], near Dyrrachium) and salt, and Heracleotic[a] origanum, and cardamomum,

[x] You will touch it without soil, is the Greek expression.

[y] Mentioned by Pliny, xxxv. 15.

[z] On the shore of the Adriatic.

[a] Harduinus ad Plin. xx. 16.

mum[b], and cumin, some fine bread, squills, a chaplet of white or of crimson wool, the chaste[c] tree, vervain, sulphur, pitchy torches; and lay on some amaranthus[d] every month, and lay on the mould; and, having scattered seeds of different kinds, let them remain.

IX.—TO DESTROY THE DRONES.

If you wish to destroy the drones, early in the evening besprinkle the inside of the covers of the hives with water; and about the break of the day open[e] the hives, and you will find the drones settled on the drops on the covers; for being always well fed with honey, they are thirsty: and having an insatiable thirst for water, they do not relinquish the moisture on the covers. You might indeed destroy them all, and none of them will escape. They are large, and they have no stings, and they are lazy. Aristotle says, that the honey made from the box-tree is of a disagreeable smell; of

[b] Matth. lib. i. c. 5.

[c] *Vitex* or *agnus*.

[d] The original specifies that of a reddish colour. See Matth. lib. iv. c. 52.

[e] It appears from this passage, that the tops of the hives were made to be taken off.

of which if persons that are healthy eat, they are disturbed in their understanding; but that persons that are epileptic[f] are immediately cured of their disease.

X.—THAT A PERSON MAY NOT BE STUNG BY WASPS.

Let the person be rubbed with the juice of the wild[g] mallow, and he will not be stung.

[f] This is mentioned by Aristotle, *de Mirabil. Auscult.* p. 1151, edit. Par.

[g] Crescentius prescribes the juice of rue as a preventive, lib. vi.

BOOK XVI.

HYPOTHESIS.

These things are in this Book, being indeed the Sixteenth of the Select Precepts concerning Agriculture; and comprising the arrangement concerning the care of horses, and the cure and the raising of them; and concerning asses and camels.

I.—CONCERNING HORSES.

THE mares out of which we are to raise colts, must be well set, and of due proportion, and of a handsome appearance; and they must have a large belly, and the same proportion with regard to the flanks; and in respect of age, not younger than three, nor older than ten years. And the horse for admission must be large in the circumference of his body, compact in all his parts: but the time for covering is from the vernal equinox, that is, from the twenty-second of March to the twenty-second of June, that the colt may be foaled about the most temperate part of the

summer,

summer, and when there is grass for it: for a mare goes with young eleven months and ten days; but the colts that are got after the summer solstice, are degenerate and useless. You are also to afford the horse rest from work at the time of admission; and he must not cover often in a day; only twice, in the morning and in the evening: and if the mare, being once covered, does not[h] admit the horse, you are to bring him to her again after ten days; and if she does not receive him, you are to separate her as being in a state of impregnation; and when they[i] are in this state, you are to take care that they may not be over fatigued, and that they may not be stationed in cold situations; for cold is inimical to breeding-mares. But we shall make the horses perform their duty with alacrity, by bringing them near the mares. We may also discern whether the future colt will be a good one, thus, from his mental and bodily perfections: as indeed from his make; when he has a small head, a black eye; nostrils that are not collapsed; short ears; a delicate neck; a long mane, a little curled, falling on the right side of the neck; a wide breast;

 good

[h] *i. e.* a second time.

[i] As in the Greek.

good shoulders; straight arms; a compact[k] belly; small testes; a double spine indeed, and if not, one that is not gibbous; a large tail, curly; straight limbs; muscular haunches; a well-formed hoof, and evenly compact in all its parts; a small frog, a solid hoof. From all these indications, it is certain that he will be a good and an elegant horse. From his mental qualities also he is thus proved: if he is not timid nor frightened at objects that appear as unforeseen, but loves to be the first among the colts; not receding, but impelling that which is before him; and in rivers and ponds, not waiting for another to go in before him, but doing this himself first with intrepidity. But you are to begin to make colts tractable after they are eighteen months old, putting on a halter; and you are to hang the bridle to the manger, that the colt, by touching, may become used to it, and that he may not be intimidated by the noise of the bits. You are also to break him, when he is three years old, before he is fed with farrago. We shall also know the age[l] of horses, and of all animals that have solid hoofs, and generally of [illegible] horned [illegible]

[k] The original implies, that the belly ought to be of a good size and compact.

[l] The time and age, in the Greek.

horned animals, from the shedding of their teeth: for when indeed thirty months are past, the colt sheds his fore teeth, which we call cutters[m], the two middle teeth below, and two above likewise; and at the beginning of the fourth year he again sheds two others below on each side, and as many above; and he then seems to produce the canine teeth. When four years are completed, and when he enters on the fifth year, he sheds the other teeth, below and above, on each side; and they which are produced are hollow; and when he enters his sixth year, the cavities of the first are filled; when he attains his seventh year, he has all his teeth complete, and they have no hollowness at all. When this period arrives, it is no longer a facility to know a horse's age: but a horse is in general free from disease, if you tie to him the horn of a stag.

II.—MARKS OF HORSES.

Some indeed reckon them that have varied[n] eyes among the most useful (as they say Bucephalus, the horse of Alexander of Macedon, was); a slender

[m] In Latin, *incisores.*

[n] In respect of colour.

a slender and a short tongue, and the face flat or curved; an elevated crest; a grey colour, one that is not easily discomposed by titillation; a straight[o] neck, full and strong, that is, not short-necked; a belly compressed, and trussed at the flanks; a just proportion; and the veins of all the body plain and full; a colour perfectly black. But Plato approves of white horses, so that the extremes in white and black are recommended: and they also reckon the bright[p] bay, the colour of good horses. It also happens that horses of other colour are frequently good. This is likewise a sign of a good horse; when standing he is impatient, and beating the ground, he meditates to exert his speed.

III.—CONCERNING THE CURING OF DIVERS DISEASES.

If a horse becomes poor, you are to set before him a double portion of parched wheat, or of baked barley; and you are to give him drink

three

[o] Υψαυχενα, having the back part of the neck elevated.

[p] Φοινικιζοντα. Aulus Gellius says, that this is the same colour as the spadix, by which the Dorians meant a branch of the palm plucked off with its fruit, which fruit was of a shining red colour.

three times a day: and if he continues to be low in flesh, you are to mix bran with wheat, and you are to exercise him gently; but if he do not eat, they pour on his food solanum[q] and the leaves of polium[r], pounded and percolated in river water. Having also macerated barley and vetches[s] in water, they set it before him; or, they pound two cyathi of melanthium[t], and mix with it three cyathi of oil, with a cotyla of wine, and they administer it. You will also cure a nausea[u], by mixing and administering garlic with a cotyla of wine with oil. If a horse also has the dysuria[v], we pour down his throat the white of ten eggs, with the ingredients already mentioned. Neither oxen nor horses will be affected with disease, if you tie the horn of a stag to them.

IV.—CONCERNING A HORSE IN A FEVER.

You are to cure a horse having a fever in the hot-bath, in the summer; and in the winter, you are

[q] In Greek, στρυχνος. Matth. iv. 67.

[r] Poley.

[s] Orobi.

[t] Nigella, or gith.

[u] Sickness, loathing, &c.

[v] Difficulty in making water.

are to cherish him so that he may not take cold: and you are to give him very little food, vetches or wheat flour; and you are to give him warm water to drink; and you are to rub him with warm wine and oil over all his body; and you are to purge him; and you are to take away blood from his neck, or from the veins about the pharynx[w] or the breast, or from the foot. You are also to rub his knees with hot vinegar; and when he seems to be convalescent, you are to wash him with warm water. But if he has a fever, and becomes poor from hard labour, pour down his throat, during three days or more, until he recovers, a cotyla of goat's milk, a measure of amylum[x], half a cotyla of oil, four eggs, having mixed with them the juice of pounded purslain. But if he has a fever on account of the flux, of humours of the tonsils, or of the head, you are to foment him; and you are to rub his palate with salt pounded with origanum, and sifted into oil; and you are to warm his feet and knees with hot water; and you are to well rub the parts about the

[w] Called by the Romans *infundibulum*, the open and primary part of the gullet.

[x] Starch: the best was the Cretan and Ægyptian, made of trimestrian wheat; Matth. lib. ii. c. 94.

the mouth with pounded solanum, and with the lees of wine; and you are to feed him with sea-wrack, or with grass, without barley. If blood flows from his nostrils, it is proper to pour into them the juice of coriander, or diluted opos[y].

V.—CONCERNING THE OPHTHALMIA[z].

If the eye is inflamed, you are to apply to it male frankincense, and the marrow of a lamb, a dram of each; a dram of the bones of the cuttle-fish, ten drams of oil of roses, the white of four eggs being mixed with them. Another remedy, for an inflamed eye: libanotus[a], amylum, Attic honey.

VI.—CONCERNING THE LENKOMA[b].

You are to mix very fine sal ammoniac with Attic or other good honey, and you are to apply it; or, you are to apply an equal quantity of butter; or, you are to blow in the bone of the cuttle-

[y] Juice of laserpitium.

[z] See book ii. c. 18.

[a] Frankincense.

[b] In Latin, *albugo*, white speck on the eyes. It has many names in English.

cuttle-fish, pounded fine, through a reed: or, you are to anoint it with the root of silphium[c], pounded with oil, twice a day; or, let the seed of the rocket[d] be blown into the eyes whole, and let it remain until it attenuates and removes the disorder by its pungency.

VII.—CONCERNING THE NERVES.

You are to pour warm water on the parts affected, and on the head of a horse having diseased nerves: you are then to put in a pot an equal quantity of ox-suet, and myrrh, and sulphur; and you are to make a suffumigation, and to warm the head, which is covered. You are also to be sure to purge the animal, and you are to take blood out of the tail.

VIII.—CONCERNING THE FLUX OF THE BELLY.

If the belly be affected with a flux, let blood be taken from the veins of the head: let the horse also drink warm water mixed with barley-meal; and if he does not become convalescent,

let

[c] By the Romans called *laserpitium*; Pliny, lib. xix. c. 3.

[d] Ευζωμον.

let oil be poured into his nostrils. The rind of pomegranate likewise stops a flux, when pounded with Syrian sumach, and exhibited by the mouth.

IX.—CONCERNING THE STROPHUS[d].

You are to wash the horse with warm water, and you are to cover him: then give him five drams of myrrh, six cotylæ of wine, and three cotylæ of oil, percolated together, and divided into three parts: and you are to warm his belly with hot sea-water, or with a decoction of myrtle-berries: and you are to give him the leaves of polium, or abrotanum, mixed with strong[e] black wine; or the rind of pomegranate with water. An equal quantity of parsley and of cucumber-seed is also of service, both being given him in his drink, with an equal quantity of honey and wine; or the seed of cardamomum pounded with water; or the seed of medica[f] is so besprinkled, as barley is, that is served. Horses also that are vertiginous are clystered with a decoction of beet, and forty drams of nitre, and thirty drams of oil. Having also pounded and warmed

[d] Cholic.

[e] Harsh, in the Greek.

[f] Lucerne.

warmed nitre, exhibit it with wine. If you will likewise make water on the ground, and with the clay rub the animal's belly, you will remove the strophus.

X.—CONCERNING PNEUMONIA[g].

SHARP vinegar warmed and exhibited, cures diseases settled on the lungs; or human urine, with twenty drams of melted hog's lard; but you are to take care that it may be genuine, &c.

XI.—CONCERNING A COUGH.

IT is proper to exhibit in a potion, barley-meal mixed with vetches[h], or beans, when a cough begins; but when it is a confirmed cough, two cyathi of honey, an equal quantity of pitch, as much oil, four-and-twenty drams of melted butter, with an addition of a moderate quantity of stale[i] hog's lard are exhibited. If it is not thus removed, pound horehound with oil and salt; and when percolated with wine, exhibit it. But some use the juice of horehound and oil, and the

root

[g] Inflammation of the lungs.

[h] Called *orobi.*

[i] Much used by the Romans, according to Vegetius.

root of wild rue: and some, mixing frankincense with oil, use it.

XII.—CONCERNING AN UNCERTAIN[k] DISEASE.

LET blood be taken from both shoulders, and medicine is thus prepared: a little rue is pounded with the root of lapathum[l], with three cotylæ of water, with two drams of opoponax[m], are mixed with them. The beast is to be fed, day and night, with wheat-flour mixed with water, and he is to have some to drink. But if the disease seizes gregarious horses, let the least indeed have three cyathi of garum[n] and oil, and the largest, double the quantity.

XIII.—CONCERNING DYSURIA[o].

SOME lay an onion, when the external coat is removed, to the bladder; others exhibit parsley

[k] When the Diagnostics were not sufficiently perfect to give name to the disease.

[l] In Latin, *rumex*.

[m] Sometimes called *heracleum*. It was much used by the Roman farriers, according to Vegetius. Matth. iii. 50.

[n] Brine of fish, or of meat; Matth. l. ii. c. 31.

[o] Difficulty of voiding urine.

parsley-seed with two cotylæ of wine, or as much onion-seed with wine, or pigeons dung, or the leaves of polium, or dried myrrh[p], or five drams of nitre, with a pounded head of garlic, with wine. Others indeed use black wine only.

XIV.—IF A HORSE VOIDS BLOODY URINE.

Having mixed clean bean-flower with the melted suet of a stag and a little wine, let it be poured into the beast's mouth during three days; or, let a cotyla of goats milk, half a mina[q] of amylum, ten eggs, three cyathi of oil, all mixed together, be exhibited.

XV.—CONCERNING ULCERATION.

If the spine be wounded, the root of iris is burnt, and, being pounded, it is laid on; or the ashes of pounded hemp, with honey, are rubbed on the parts, having been previously washed clean, with stale urine.

XVI.

[p] If the reading is correct, it may mean the bark of the tree from which the myrrh was taken; see Matth: l. i. c. 67.

[q] The Attic mina, with which drugs were weighed, was

lb.	oz.	dwts.	grains.
1,	2,	11,	10 + $\frac{3}{7}$, Troy.

XVI.—CONCERNING INFLAMMATION.

All inflammation is cured with salt and oil; or with leaves of polium, burnt and percolated in oil; or with verbascum[r], boiled with wine, and laid on as a cataplasm.

XVII.—MALAGMA[s] FOR THE JOINTS.

Mix eight drams of frankincense, an equal quantity of galbanum, twelve drams of lees of wine, black resin, nitre, sulphur, four drams of each, a cyathus of Egyptian mustard, an equal quantity of cardamomum, a hundred berries of the bay, a mina of dry figs, a few leaves of the rododaphne, a sufficient quantity of quick lime; and you are to mix the dry ingredients with such things as are moist, and, when laid on a cloth, you are to apply them as a plaister.

XVIII.—CONCERNING THE MANGE.

You are to rub in equal quantities of tar from the cedar, of resin, of alum, with vinegar, in the sun. Or, when the parts affected are rubbed with hot ashes, you are to wash them till they bleed: you

[r] Φλομω.

[s] From *μαλαττω*, to soften.

you are then to anoint them with litharge and alum, well pounded with lentiscine oil. Or, you are to apply aphronitrum[1], and sea-salt[2], and wheat flour, an equal quantity of each, percolated with vinegar. Or, you are to rub in the ashes of the burnt root of capparis, mixed with lard, the parts having been previously washed clean with a lixivium.

XIX.—CONCERNING A LEECH.

If a horse swallows a leech, you are to pour down with a horn, some warm oil mixed with wine, while the animal lies in a supine posture. Or, you will cure him by burning bugs near his nose, or killing them in his nostrils; for the leech will either be voided, or it will die. You are to use this for oxen and other animals.

XX.—HOW YOU ARE TO CURE THE BITE OF A SCORPION, OR OF SOME OTHER REPTILE.

You are to cover the part affected with cow-dung, or pounded solanum, or with spurge, or with the seed of hyoscyamus, or with the juice of linseed,

[1] Spume of nitre. Matth. v. 89.

[2] Sea-spume, in the Greek.

linseed, or with alum, or with aphronitrum, or with parched salt: one of these being laid on, will be of utility. But you will cure the animal with water strained through a cloth, and poured into its nostrils. And indeed, in general, the same remedies as are salutary to cattle for the bite of reptiles, almost always cure human creatures. But for partial diseases, in horses, and asses, and mules, bleeding is proper.

XXI.—CONCERNING ASSES FIT FOR ADMISSION.

We are to choose asses for admission[v] thus, and we are to raise them as we do horses. But some, acting judiciously, tame wild asses, and they produce very fine foals; but they are not to be confined, but to be left at liberty. The animal is indeed very easily tamed, nd he answers the purposes of tame animals in all services; and, when once tamed, he does not become wild, as other

 animals

v When the male was brought to the female, for the purpose of propagation, the Greeks and Romans called it by a name correspondent to the English word *admission*; hence, in Latin, *admissura, equus admissarius.* Had they used the term *breeding*, it would have been inadequate to express the idea; because it is, in strictness of language, only applicable to the female.

animals do, and his offspring grows like himself. It is proper for these animals to cover a few days before the summer solstice. The female ass goes with young twelve months. But it is better for mares to be covered by asses, than female asses by horses. Some indeed, wishing to have a superior breed, put asses colts under mares, for they will be fed with better milk; and being brought up with them, they will have a more firm attachment for the mares from habit, so that they will readily cover them. Let the time of sucking be two years, as it is with regard to horses. But asses are fit for admission from three to ten years; and you are to take care, that they that are to cover may be of a handsome make, for their offspring will resemble them. Some being more than consistently studious of beauty, put on the ass, or on the horse, or any other animal for admission, a garment of such a colour as they wish the colt to have; for such as the colour of the garment may be, with which the animal for admission is covered, such will be the colour of the colt. You will cure lame asses, if you wash all the foot with warm water, and clean it all around with a scraper: and when you have done this, pour some suet over it, especially that of a goat; or, if you have not it, ox suet, with hot stale urine; and do this until he is cured.

XXII.

XXII.—CONCERNING CAMELS.

Didymus says, in his Georgics, that the camel goes without water during three[w] days, and that it is cured of the mange by the pitch[x] of cedar. But the camel does not cover[y] its dam, nor its sister foal. The same Didymus says, that a Bactrian camel was impregnated by wild boars that were in the same pastures with it on the Indian mountains: and from the boar and from a she-camel, is produced the camel having two bunches on its back, as the mule is from the horse and the ass. The camel that is thus produced, bears many marks of its sire; for its hair is thick, and it is powerful with regard to strength, and it does not stumble in miry places, but is kept up by its powerful strength, and it carries double the burden that other camels do. They indeed call those Bactrian camels with propriety,

 because

[w] سبع is one of the Arabic names of a camel, because it goes without water seven days.

[x] *Cedria.* It is, by some of the ancient authors, called the *tar of cedar.*

[y] This was a prevailing idea among the ancients, probably to point out that incest was odious and unnatural. See Arist. vol. i. p. 953.

because they were first produced among the Bactrii[z]. I have seen dromedaries[a] contending with horses on the course, and overcoming them. Florentinus indeed says, in his Georgics, that he saw a camelopardalis at Rome: and I have seen a camelopardalis at Antioch[b], brought from India.

[z] They lived between the Caspian Sea and Mount Caucasus.

[a] This animal was called by the Greeks, δρομας καμηλος.

[b] In Syria, between Sidon and Mount Taurus.

BOOK

BOOK XVII.

HYPOTHESIS.

These things are in this Book, being indeed the Seventeenth of the Select Precepts concerning Agriculture, and comprising the arrangement concerning the admission of the herd, and the breeding and rearing of it, and the various means of curing it.

I.—CONCERNING COWS.

THE cows are not to be permitted to be full fed, during thirty days before admission; for the poorer[c] they are, so much the more will they be adapted for breeding.

II.—CONCERNING COWS, OR HEIFERS.

You are to choose well-made heifers, with the body of due length, of proportionable breadth, with good horns, wide foreheads, black eyes; having

[c] So say Colum. vi. 24, 3; Varro, ii. 5; Virgil, G. iii. 129.

having the jaws[d] compact, a well-formed flat nose, not crooked; having open nostrils, a long and a strong neck, a good breast, having blackish lips, a deep flank, a wide back, a large eye; a long tail reaching to the heel, well covered with hair; short arms, straight legs, strong, rather thick than long, not rubbing against each other; the feet not dilated in walking, nor the hoofs spread, the toes[e] perfect and equal, the hide soft to the touch, and not hard as wood. They also approve of those as very good, that are of a yellowish colour, and have black legs, as being of a generous breed. It is then indeed a good thing that a cow should be distinguished by all these gifts of nature, at least by many of them. The beasts in the herd know the voice of the cow-herd, and, when called by their names, they understand him, and they obey the command of their leader.

III.—CONCERNING BULLS.

You are not to permit the bulls to feed with the cows during two months before admission; and

[d] Γναθος signifies the prominent part of the cheek, when applied to the human feature. It was called by the Romans *mala* and *bocca*, the last of which they borrowed from the Gauls.

[e] Nails, in the Greek.

and you are to give them plenty of grass; and if you have not a sufficient quantity, you are to give them bitter vetches[f], or orobi, or macerated barley. They are not fit for admission when less than two years old, nor when they are more than twelve years of age: and the same may be said in respect of the cows. It is indeed proper to separate them from the cows for the space of two months; and you are to drive them to the herd, imposing no restraint on their desires.

IV.—THAT THE COWS MAY NOT BECOME WEAK.

HAVING macerated ground vetches, give the cows them to drink every month. You are also to cure the wounds of cattle, by pounding and applying the wild mallow.

V.—CONCERNING ADMISSION.

THE middle of the spring is the season fit for admission; and if the cows do not receive the bulls, you are to pound the inside of a squill, that is, the most tender part of the squill, and as one

[f] This kind was called *ervum* by the Romans.

one might say, the choicest part, with water, and you are to apply it. If the bulls are also remiss, burn a stag's tail, and pound it; and, having mixed it with wine, apply it, and it will produce a due effect. This indeed would happen not only in respect of bulls, but with regard to other animals, and even to the human race. Oil being applied[g], is inimical to stimulation. The herb also called *polyspermos* and *polygonos*[h], will make animals more prolific.

VI.—CONCERNING THE FORE-KNOWLEDGE OF THE PROGENY.

LET persons who wish to know whether a cow will produce a bull or a cow-calf, take notice. If[i] the bull indeed descends to the right, the offspring will be of the male kind; but if to the left, it will be of the female race: and if you wish to have a bull-calf, restrain the seminal effusion from the[k] left side at the time; and if a cow-calf,

[g] Smeared, or rubbed, in the Greek.

[h] In Latin, *polygonum*. See Matth. iv. c. 4.

[i] See Colum. vi. 24. Varro, ii. 5. Pliny, viii. 45.

[k] See Columella, vi. 28; Palladius, iv. 11. Hippocrates made the same observation, *De Superfœt.* p. 265.

cow-calf, on the right side. But some have recourse to the aid of nature; and if a person wishes to have a bull-calf, he contrives to have admission performed when the north[l] wind blows; but if a cow-calf, when the south wind blows.

VII.—CONCERNING THE ŒSTRUS[m], WHICH IS CALLED MYOPS.

We know that the œstri, that sting the cows, make them distracted; but they will not come near them, if, having pounded the berries of the bay, and boiled them in water, a person sprinkles it over the place where they are fed; for the œstri will fly away, from a natural antipathy: and if cows are stung by them, they also pound ceruse with water, and wash them with it.

VIII.—CONCERNING THE REARING OF CALVES.

We are to feed the cows that give milk, with cytisus or medica; for, being thus fed, they will have

[l] See Aristotle *de Generatione Animal.* lib. iv. c. 2.

[m] Called by the Romans *asilus*, a flying insect like a wasp, without a sting or proboscis, which makes a violent whizzing. See *Esperienze ed Osservazioni da Vallisnieri.* Padua, 1723, 4to.

have more milk. We are also to cut[n] the calves, when they are two years old; for it is not proper to cut them later. We are also to apply[o] to the wounds, ashes and litharge; and after three days, tar and ashes, mixed with a little oil.

IX.—THAT WORKING CATTLE MAY NOT BE TIRED.

HAVING boiled oil and terebinthine[p] resin, anoint their horns.

X.—FROM WHAT AGE COWS ARE FIT FOR BREEDING.

THEY are not fit for breeding before they are two years old, that they may calve when they are three years old; but if they calve when they are four years old, it is better. A cow is in general fit for breeding during ten years. Bulls are in the perfection of vigour from the age of three years. The season indeed for the admission of quadrupeds

[n] Columella, vi. 26. Pallad. vi. 7.

[o] The Greek says, the application was made in the form of a cataplasm.

[p] The resin of the terebinthus. This is now called *turpentine*.

peds is from the rising of the Dolphin[q], that is, about the beginning of the month of June, during forty days; and a cow goes with young ten months. But you are to cast out of the herd those that are steril, and feeble, and superannuated; for care bestowed on things that are useless is of no avail.

XI.—THAT CATTLE MAY NOT BE INFESTED BY FLIES.

Having pounded the berries of the bay quite fine, and having boiled them with oil, anoint the cattle, or rub them with their saliva. Bulls having their nostrils anointed with oil[r] of roses, become vertiginous.

XII.—TO MAKE OXEN FAT.

You will make oxen fat, if you shred and macerate cabbages in sharp vinegar, and set them before them the first day they come from pasture; having then mixed sifted chaff and wheat-bran during five days, and on the sixth four cotylæ of ground barley, you are gradually to increase their feed

[q] On the fourth of the ides of June; Colum. xi. 2.

[r] Matth. prescribes the method of making it; lib. i. c. 42.

feed the six following days. And in the winter indeed you are to feed them about the cock-crowing; and a second time, about the dawn of the day; and you are to give them drink; and the remainder of their food you are to give them about the evening. But in the summer you are to give them their first feed at the break of day, and the second at noon, you will then give them drink; and you may then give them their third feed about the ninth hour; and you are to give them drink a second time: and in the winter indeed give them warm water, but in the summer, that which is lukewarm. Wash their mouths also with urine, removing the inherent phlegm, and rid the tongue of worms, taking them out with a forceps, for worms breed in their tongues; and rub their tongue thoroughly with salt; and it is proper to pay attention to their litter.

XIII.—CONCERNING THE CURE OF CATTLE, AND THAT THEY MAY NOT SWALLOW ANY HARD SUBSTANCE.

LET neither hens nor swine get to the crib; for the dung of each of these, if it be eaten, is injurious to the animal; and a cow will not swallow

any

any hard substance, if you will hang the tail of a wolf on the crib.

XIV.—CONCERNING AN UNKNOWN DISEASE.

All the diseases of animals are almost unknown; for how is a person to understand them, or of whom can he inform himself of the internal diseases of the animal? If you then pour into his nostrils pounded silphium with genuine black wine, you will cure every unknown disease. Democritus indeed advises to put the root of squill and of buckthorn in the drink of cattle, during fourteen days, at the beginning of the spring. But if the beast labour under a well-known disease, you will thus cure him: macerate mountain-sage and horehound in their drink, an equal number of days, and exhibit it, and you will effect a cure. This is indeed of service, not only to oxen but to other beasts. Salt also mixed with their food is of consummate utility; but the best and the most wholesome thing is amurca, given gradually* with their water. The grass medica is also of utility.

XV.

* A little at first, lest a great quantity make the beast loathe it.

XV.—CONCERNING THE HEAD-ACHE.

It is first proper to know that the animal has a head-ache. When he therefore hangs down his ears and does not eat, he has the head-ache. His tongue is therefore well-rubbed with thyme pounded with oil, and with garlic, and with fine salt; and crude ptisane, reduced to solution with wine, will be of utility. If you also take bay-leaves, as many as will fill your hand, and put them into the beast's mouth, or the rind of pomegranate, you will be of service to the animal. If you also pour into the beast's nostrils a small[t] quantity of myrrh with two cotylæ of percolated wine, you will cure him.

XVI.—CONCERNING A DIARRHÆA[u].

Having pounded the leaves of buckthorn, and having covered them with asphaltos, give them the beast to eat. Some indeed give the animal the pounded leaves of pomegranate covered with polenta. Others exhibit two cotylæ of polenta, and

[t] A quantity of the size of a bean, in the Greek.

[u] Too frequent a discharge of the contents of the intestines.

and half the quantity of the flour of parched wheat, mixed with water.

XVII.—CONCERNING INDIGESTION.

A BEAST labouring under indigestion is known from not eating, and from frequent eructations, and from moving his limbs with a kind of contortion, and from a dejection of spirits. We are therefore to cure him, by giving him warm water to drink; and a quantity of cabbage, well macerated in vinegar, to eat. But some, boiling the tender parts of the cabbage, and pounding them with oil, pour them into the mouth with a horn, and, covering the beast with warm clothes, they force him to walk: this is not only of service to oxen, but to all cattle. Others indeed, pounding the leaves of the wild olive, or the tender shoots of other trees, and pouring water on them, percolate them; and they then exhibit six cotylæ in the space of two days.

XVIII.—CONCERNING THE BUPRESTES[v].

Some pour oil into the beast's nostrils; others likewise pour the fruit of the wild fig-tree, macerated in water, into the beast's nostrils.

XIX.—CONCERNING THE COLIC.

An ox that has the colic, does not remain in the same place, nor does he touch his provender, but groans. You are therefore to set little provender for him; and you are to prick a vein[w] near the hoof, that the blood may flow. Some indeed open a vein in the tail, that the blood may flow, and they tie on a cloth. Others, mixing onions and salt, and having made them of a proper form, apply them internally, and they compel the beast to run. Others pound and dissolve nitre, and pour it into the beast's mouth.

XX.

[v] Sometimes swallowed by cattle among their feed, and of dangerous tendency. See Matth. lib. ii. c. 55, and Pliny, lib. xxx. c. 4.

[w] The flesh, in the original.

XX.—CONCERNING AN OX THAT HAS A FEVER.

An ox that has a fever does not go to his provender; he bends his head downward; sheds tears; he[x] has what is called *gramia*; he is hollow about the eyes. You are then to cure such a beast thus: take some agrostis from shady situations, and having washed it, give it him to eat; or vine leaves. You are also to give him very cold water to drink, not in the open air, but chiefly in a shady place: you are also to wipe his ears and his nostrils, with a spunge dipt in water. Some burn his face with a cautery, and the parts under the eyes; and they spunge them twice a day with stale urine, until scales[y] fall off, and the wounds are covered with a scar. The ears are also lanced, that blood may flow. Some, having mixed polenta with wine, give it the beast to eat; and some wash him with brine, and keep him warm with clothes. Some also give cytisus with wine: and this is useful not only to oxen, but to other cattle.

 XXI.

[x] Λημας εχει. The sordes of the eyes were, by the Greeks, called λημαι; and by the Romans, *gramia*.

[y] Εσχαραι, incrustated matter, adhering to a wound from the act of cauterizing, was called εσχαρα.

XXI.—CONCERNING AN OX THAT HAS A COUGH.

Having macerated ground barley, and the finest chaff, and three cotylæ of ground vetches[z], divided into three parts, give them the beast to eat. Some also pound the herb artemisia[a], and dissolve it in water, and press it; and they exhibit it during seven days before the beast touches his provender.

XXII.—CONCERNING SUPPURATION.

If an ulcer be suppurated, it is proper to clean it, and to wash it with warm ox-stale, and to wipe it with wool; then to lay on a plaister of fine salt and tar.

XXIII.—CONCERNING LAMENESS.

If an ox be lame, on account of the part being affected with cold, it is proper to wash the foot, and, after opening the affected part with a knife, to foment it with stale urine; then throw on some salt,

[z] The *orobi*.

[a] In French, *armoise;* Matth. iii. 111.

salt, and wipe it with a spunge, or with a rag: it is then proper to drop on the part affected goat or ox suet, melted with a hot iron. But if he be lame by treading on a sharp stake, or on such a thing, you are indeed to apply other things likewise; and, having melted wax with stale oil, and honey, and the flour of vetches, and having permitted it to cool, lay it on the ulcer; then take some fine sifted shell powder, and figs, or pomegranates pounded and mixed, and spread them on a cloth, and lay them on; and tie them carefully that nothing may get in, until he may be able to stand; for thus he will be cured: and on the third day dress it. And if he be lame through an impetuous flux of matter, you are to warm the part with oil and sweet wine boiled; then you are to lay on hot omelysis[b]: and when it is tender, you are to open it; and you are to lay on the part, when washed and opened, leaves of the lily, or squill with salt, or polygonum, or pounded horehound.

XXIV.—CONCERNING THE MANGE.

They cure the mange, and eruptions, by rubbing them with stale ox-stale, and with butter: and

[b] xiv. 7.

and some lay on resin, or tar with wine; and so cure them.

XXV.—CONCERNING BILE[c].

You are to cauterize the limbs of the ox down to the hoof, and constantly to foment them with hot water; and you are to cover him with clothes.

XXVI.—CONCERNING A CHILL.

You are to exhibit black wine that has been percolated.

XXVII.—CONCERNING WORMS.

PERSONS who wash the ulcers with cold water, kill the worms[d].

XXVIII. — CONCERNING THE LOATHING OF PROVENDER.

You are to sprinkle the provender with a sufficient quantity of amurca; and, having mixed a proportionable quantity of resin, or of turpentine, smear the beast's horns to the roots.

XXIX.

[c] Col. vi. 30. Vegetius, iii. 50.

[d] Ευλας, they were bred in ulcers

XXIX.—CONCERNING WATERY[e] PUSTULES.

It is proper to throw the ox down into a supine posture, and, having raised his head, to examine his tongue, if it has watery pustules[f]: and it is proper to burn these with pointed hot irons; then to rub the ulcers with pounded leaves of the wild olive, and with salt, or with fine salt and oil, or with butter and salt; or to give him the root of the wild cucumber dry, pounded with figs, to eat; or to give him two cotylæ of polenta, and an equal quantity of flour of parched wheat, macerated in wine.

[e] A wrong title seems to be inserted to this chapter, in the original.

[f] Called Φλυκταιναι, in Greek.

BOOK XVIII.

HYPOTHESIS.

These things are in this Book, being indeed the Eighteenth, and comprising the arrangement concerning the choice and approbation of sheep, and concerning their admission and breeding, and the cure and care of them.

I.—CONCERNING THE CHOICE OF SHEEP, AND THE APPROBATION OF THE MALES, AND OF THE FEMALES.

THE best ewes are they which produce much and fine wool, long and thick indeed over the whole body, and especially about the fore and the hind part of the neck; and such as have all the belly covered with plenty of wool, and such as is very soft, and of the same colour. It is also proper that they may have good eyes, well-proportioned legs; for these are the best for rearing lambs. The rams also ought to be of a compact make, of a handsome appearance, with grey eyes, foreheads thick with hair, good horns of a moderate size, ears covered with thick wool, a wide

wide back; having the testes large; having no difference of colour on the body. You are to approve the age of the rams and ewes when they are three years: and one ram is sufficient to cover[g] a certain number of sheep. One man, with the assistance of a boy, will be sufficient to have the care of a hundred and twenty sheep. A sheep also goes with young five months. But the best sheep are they that have straight hair; for they assert, that those that have curled hair are by nature weak.

II. — CONCERNING THE CARE AND THE PRESERVATION OF SHEEP.

THE cotes ought to be numerous and rather capacious; and you are to make them warm and dry, and the pavements shelving; and you are to make them level, pitching them with stones. You are also to set the cribs at the upper end of the pavement, and[h] you are to fix a paling over them, that the sheep, taking their provender, may not leap over them. In the summer indeed they are fed

[g] My copies say ν. *i. e.* fifty.

[h] By the change of one letter, this part of the sentence would run thus; "and you are to fix lattice over them, that "the sheep taking their provender may not tread upon it."

fed in the open air, and they are folded out: but when the sun is very powerful, let them be driven into a shady place; but not *vice versâ*, for[i] the cold is very hurtful to them. But that beasts that are pernicious to them, may not get[k] to them, you are to make a fumigation of women's hair in the cotes, or of galbanum, or of hartshorn, or of goats hoofs, or of their hair, and of asphaltus, and of cassia, or of conyza, or of something else that has a strong smell, by themselves, or even pounded with more ingredients. You are to use for the litter of the sheep, calaminth[l], and asphodel[m], or pulegium, or polium, or conyza, or abrotonum; for noxious beasts fly from such things. You are also to set before them, for provision, cytisus, and medica, or fenugreek, or oats[n], and the refuse of pulse, and barley-chaff: and these are improved, when besprinkled on the threshing-floor with brine. The deciduous fruit of fig-trees, and their leaves, when

[i] There seems to be some defect in this place.

[k] Creep, in the Greek.

[l] Matth. l. iii. c. 36.

[m] Matth. l. ii. c. 164.

[n] This grain is seldom mentioned by the ancient agricultural writers. Pliny says that it was much used by the Germans; l. xviii. c. 17.

when dried, are fit provisions for sheep. You are also to drive them out to pasture indeed in the summer before sun-rising, while the dew remains on the ground; and in the winter, when the frost and all the dew have disappeared: and you are always to contrive that they may have the sun on their hind parts. Let the number of the flock also be always uneven, as having a certain natural power for the preservation and safety of the flock.

III.—CONCERNING ADMISSION AND YEANING.

You are to separate the rams two months before admission, and you are to give them a more abundant share of provision; and when they acquire a degree of corpulence and strength, you are to send them away to the ewes: and the proper age of rams for admission is from two to eight years; and it is the same with regard to the ewes. It is also proper to know how the rams rather follow the old ewes, which are covered with greater facility; and then the young ones. But they are not to be covered too late, for it is hurtful. Some indeed, wishing to have lambs and milk almost all the year, contrive to have the season of admission at different periods throughout

the

the year. The rams are indeed in proper tone for admission, when onions are mixed with their food, and the herb polyphoros[o] and polygonus, which rouse other cattle for the office of admission. But you are not to compel them to use waters to which they have not been accustomed. If a person indeed wishes to have more males produced, let him send in the rams when the flock feeds, when the north wind[p] blows, on a fine day; but if he is desirous of having more ewe lambs, let him do this when the south wind blows. This also seems congenial to these and to all other animals. If restriction[q] is also practised on the right side, as it has been suggested with regard to oxen, an ewe lamb will be produced; but a male, if the restriction is on the contrary side. You are to confine the lambs in the cotes by themselves, after they have had milk enough; for when they are with the ewes, they tread upon them. You are not to milk the ewes during two months; and it will be better if you do not milk them at all, for thus the lambs will be very well fed. It is proper to dispose of the lambs from those that

lambed

o See book xvii. 5.

p The Greek expresses, when the north wind blows against them, and the south wind behind them.

q See xvii. 6.

lambed for the first time, as being unfit for saving.

IV. — CONCERNING SHEEP, THAT THEY MAY FOLLOW THE SHEPHERD.

Stop their ears with wool.

V.— THAT A RAM MAY NOT BE PUGNACIOUS.

Perforate[r] his horns near the ears.

VI. — WHEN A SHEEP IS WITH YOUNG, THAT YOU MAY KNOW WHAT COLOUR THE FŒTUS HAS.

Open[s] the sheep's mouth: if you find her tongue black, she will produce a black lamb; and if white, she will produce a white one; and if variegated, the offspring will be variegated.

VII. — THAT LAMBS MAY NOT BE UNHEALTHY.

Feed them with ivy during seven days, and they will not be unhealthy.

VIII.

[r] Colum. vii. 3. Pliny, viii. 47.

[s] Pliny viii. 47.

VIII.—AT WHAT TIME, AND IN WHAT MANNER, YOU OUGHT TO SHEAR YOUR SHEEP.

It is proper to shear your sheep, neither[t] when it is cold, nor in the summer season, but in the middle of the spring; and you are to smear the wounds that are made in shearing, with tar, and the rest of the body with oil and wine, or with the juice of bitter lupines boiled: but it is better to smear them with an equal quantity of wine and amurca, or with oil and white wine, mixed with wax and suet; for this is not hurtful to the wool, and it is a preventive against the mange, and an impediment to ulceration. It is likewise proper to observe that they may be sheared, having been well cleaned, after the first[u] hour, the dew that fell on the wool during the night having been well dried, more[v] properly in the sun; for when a sheep sweats while it is sheared, the sweat is taken into the wool, and it becomes of a better colour, and softer.

IX.

[t] Columella says that the same period cannot be observed in all countries; vii. 4. 7.

[u] Seven o'clock.

[v] Varro, ii. 11.

IX. — CONCERNING SHE-GOATS AND HE-GOATS.

Goats love mountainous situations: and this animal resembles the sheep in many points; for it is covered in the same seasons, and it goes with young five months as sheep do. But it generally produces two at a birth, and it cherishes its young, and it makes no trifling returns from milk, and from cheese, and from its hair. The hair is indeed useful for making ropes and sacks, and things of this kind, and for nautical purposes, for things made of it are neither rent with facility; nor do they naturally rot, unless they are greatly neglected. But it is necessary to select for breeding such as are of a compact make, large, and muscular, and having the skin indeed smooth, thick hair, and having large and ponderous udders; for these are best for keeping: the animal naturally ill bears the cold, as it is always feverish; and if the fever leaves them[*], they die. From the he-goats they select such as are large, and such as have a good flank, and large hips[x], thick, long, white hair, having the back and the fore part of the neck short and thick, and

[*] The transitition to the plural, as in the Greek.

[x] Ισχια mean the hip-bones.

and the wesand of due length. The best time for admission is before the winter solstice. A he-goat will not go away, if you cut off his beard.

X.—THAT GOATS MAY PRODUCE MUCH MILK.

GIVE them cinque-foil to eat during five days before they drink. Goats produce much milk, if you tie dictamnus about their bodies.

XI.—THAT SHEEP AND GOATS MAY NOT BE AFFECTED BY PESTILENTIAL DISEASE.

HAVING well pounded the stomach of a stork with water, you are to exhibit a spoonful to each of them.

XII.—CONCERNING MILK, AND THAT CATTLE MAY PRODUCE MUCH MILK.

ALL cattle produce much milk, besides cherishing the fœtus, if they eat cytisus, or if you tie dictamnus round their bodies[y]. Milk warmed over the fire, and stirred with a sprig of the fig-tree,

[y] Bellies, in the Greek.

tree, is coagulated. Oxygala* also poured on oil, or on the leaves of terebinthus, remains mellow.

XIII.—CONCERNING THE CURE OF SHEEP.

It is proper to take care that the sheep may not fall into a pestilential disease at first. At the beginning of the spring, then, you are to mix mountain sage and the herb horehound, pounded together, in their drink, for fourteen days. You are to do this likewise in the autumn, the same number of days: and if the disease overtakes them, you are to make use of the same things. The grass of cytisus also being eaten, is of service; and so are the tenderest roots of the hardest *calamus*, when macerated in their drink. It is likewise necessary to remove the beasts that are sick to another place, that those that are sound may not herd along with them, and that they, partaking of other water and air, may become convaleseent.

* Milk that was turned. Columella prescribes the method of making it, xii. 8. Galen says that cheese was made with it.

XIV.—CONCERNING THE TAKING OF WOLVES.

You are to take wolves thus: Blenni[a] are small sea-fish, which some call *lupi;* these contribute to the taking of wolves in this manner: having caught a considerable number of them, pound them quite fine in a stone or wooden mortar; and, having made a very large coal-fire on the mountain which the wolves inhabit, when the wind blows, take some of these fish and lay them on the fire; and having mixed the blood, and the flesh of lambs cut quite thin, add them to the pounded fish, and withdraw from the place; for when there is a strong smell from the fire, all the wolves that are near will flock to the place: and when they have partaken of the flesh, or of the fumigation, being stupified, they fall asleep; and when you find them in this torpid state, kill them.

XV.

[a] Hippolitus Salvianus says, "Two blenni are hardly taken "in the Roman sea in a year; but they are found more fre-"quent on the Greek coasts." They are found on the English coasts. Mr. Pennant was the first who gave this fish an English name; class iv. s. 90.

XV.—CONCERNING THE MANGE.

The mange will not seize the sheep, if a person anoints them, after the shearing, with the things we have mentioned. But if this happens from your neglect, you are to cure it thus: Fresh amurca is percolated, and the water in which bitter lupines have been macerated, and the lees of white wine, an equal quantity of each being mixed, are warmed in a vessel, and the sheep being anointed remains for a couple of days; and on the third day you are to wash it with sea-water, or with warm brine, and afterwards with river-water. But others pour on the seeds of the cypress with water. Some also rub on cyperus, pounded with ceruse and butter. Some, when an ass has staled on the road, rub on the clayey consistence. Some also, acting more judiciously, do not apply any of the remedies already mentioned for the mange, before the infected animal is shorn, and previously washed with stale urine. Yet in Arabia they are satisfied with the application of the cedria[b], as in the cases of camels and elephants. You will also cure the mange of sheep by washing them with urine, and anointing them with sulphur and oil.

[b] The tar of cedar.

XVI.—CONCERNING THE PTHEIRIASUS[c].

If sheep have vermin or ticks, you are to pound the roots of maple, and to boil them in water; and you will then divide the wool from the head to the loins, and you are to pour this on warm, until it finds its way over all the body. Some also use cedria only. Some likewise prepare the root of mandragora[d] in the same manner; but you are to take care that they may not taste it, for it is pernicious. Others indeed make a decoction of the root of cyperus, and wash the sheep with it.

XVII.—CONCERNING DIVERS DISEASES.

If the burning heat of the sun hurts the sheep, and they incessantly fall, and do not eat, you are to press out the juice of wild beet, and to exhibit it; and you are also to compel the sheep to eat the beets. If they have a difficulty in breathing, you are to cut their ears with a knife, and you are to remove them to other situations. If they cough, you are to pour almonds, cleaned

and

[c] *Morbus pedicularis* of the Romans.

[d] Matth. vi. 16.

and pounded, and mixed with three cyathi of wine, into their nostrils. If they swell from unwholesome pasture, you will cure them by taking away blood; the veins above the lips being opened, and those that are under the tail, near the rectum: you are also to exhibit a cotyla and a half of human urine. If they likewise eat worms with their grass, you are to use the same remedy. If they swallow a leech, you are to give them sharp vinegar, warm, or oil. If they have an abscess that is apparent, you are to open it; and you are to pour into the wound fine parched salt with tar. If they are bit or stung by some venemous reptile, you are to give them melanthium with wine; and you are to prepare and to give them such things as we have prescribed for oxen and other beasts. Wolves will not attack cattle, if you make the shepherd carry a squill about him.

XVIII.—CONCERNING HERDS OF GOATS.

We will treat of the care of goats, as we have done in relation to sheep, with regard to the rearing of them, and their diseases; and we must not pass over what is peculiar to them, for they are not fed together in a flock as sheep are, but they are generally dispersed, and they wantonly

skip one from another in the pastures; and they delight in precipitous situations. But it is clearly demonstrated, from this circumstance, that the goat has a greater share of understanding than other dumb animals; for when it is affected with a dimness of sight, it goes to the oxyschænos[e], and pricks itself.

XIX.—CONCERNING THE MAKING OF CHEESE.

Most persons coagulate the milk with what some call *the juice*, though most farmers call it *rennet*, and the best is from kids. Parched salt also coagulates milk, and the juice of the fig-tree, and its tender shoots and leaves, and the fibres which spring on the tops of artichokes, which are unfit for eating; and pepper, and the pellicle of the domestic fowl, which, lining the stomach, is destined for the fæces. Cattle feeding on the willow will produce thick and better milk, and better still if they feed on cytisus. Milk keeps during three days, if the day before you remove it, you pour it into a vessel and boil it, and pour

it

[e] Pliny, xxi. 18. This author takes notice of the goat's curing a cataract, by pricking it with the bramble, viii. 50. This sagacity of the goat is mentioned by other Greek authors. *Antiphili Epigramma Anthol.* Gr. i. 29, 2.

it into another vessel, stirring it with ferula[f], or with a reed, until it cools. If you also sprinkle a little salt over the cheese, it keeps mellow the longer, with the seed of cnicus[g] with warm water, or with warm honey laid on it. Cheese also keeps when washed with river-water, and dried in the sun, and put in earthen vessels with thymbra[h] or thyme, the cheeses being separated one from another as much as possible; sweet wine vinegar or oxymel being then poured on them, until the liquor gets in and covers the whole. Some indeed, having put cheese into sea-water, preserve it. Cheese being put in brine, keeps white; but more firm and of a more pungent taste, when smoke-dried. Every kind of cheese seems to keep better, if it be put among pulse, and especially the chichling-vetch and peas: and if it is old, or hard, or of a bitter taste, you are to macerate it with omelysis (and omelysis is meal made from barley, that has not been parched), and you are to put the cheese in water; and you are then to take away what is on the surface.

[f] Fennel-giant.

[g] Carthamus, or bastard saffron; Matth. iv. 182.

[h] In Latin, *satureia*; Matth. iii. 38.

XX.—CONCERNING THE PROVING OF MILK.

You are to prove milk, whether it has water, by putting in the oxyschænos and taking it up, and dropping the milk on your nail. If indeed it immediately flows off, it is mixed with water; but if it remains, it is not adulterated.

XXI.—COMPENDIOUS PREPARATION OF MELCA.

What is called *melca* will be readily prepared and of a superior quality, if you pour sharp vinegar into fresh earthen vessels, and set them on hot cinders, or over a gentle fire, that is, on coals; and when the vinegar has boiled a little, take it off the fire, that it may not be absorbed by the vessels: put the milk into the same vessels, and set them in a cupboard or a closet, where they may remain unmoved; and on the day following you will have a good quantity of melca, much better than what is prepared with much art. Change the vessels after the first or second using.

BOOK XIX.

HYPOTHESIS.

These things are in this Book, being indeed the Nineteenth concerning the Select Precepts of Agriculture; and comprising the arrangement concerning the cure and the care of dogs, and concerning hares and stags, and swine; and concerning the salting of meat.

I.—CONCERNING DOGS.

WE are to provide dogs of a generous breed for the protection of the flock; and these are not without their marks, having indeed large bodies, and being powerful in respect of strength, and of no mean sagacity, endued with a deep and terrific[1] voice; and when a person approaches, not excited by a rash and undesigning force, but deliberating where it is proper to make their attack; for such as these are also stronger and more difficult

[1] The Greek word implies it was to be so terrific as to affect the person that made his approach, as if he was knocked down.

ficult to be overcome. You are also to defend dogs for the protection of the flock, by fixing a piece of leather[k] about their necks; and to secure the wind-pipe and all the pharynx[l]; and you are to mount it with iron nails; for if a beast hurts any of these parts, it will kill the dog; but if it bites any other part, it will only make a wound. It is also necessary to adapt the breed and the age of the male and of the female, and to take care that the dogs, that are from the same bitch, may not propagate from each other. We are also to feed the breeding-females, not with wheat but with barley bread, for this is of the most nutritious quality: and having boiled the bones of sheep without the flesh, we are to set them before them, that the marrow from the bones may make the liquor palatable and rich, which we are to pour on the bread, when it has been repeatedly crumbled, and to set before them. We are also to set before the bitches that have pupped, barley-meal mixed with cow's or goat's milk, and some of the boiled bones, as it has been already mentioned.

[k] The Greek says, raw leather, *i. e.* that had not been dressed.

[l] The parts contiguous to the upper end of the wind-pipe; though the word properly means, what the Romans called *infundibulum*.

tioned. We are also to assist the new-whelped pups, for the milk of the dam is not sufficient for them; but we are to give them bread to eat, having soaked it in milk[m], and in the liquor made from the bones: and we are to lay before them the bones, that they may strengthen and sharpen their teeth.

II.—ANOTHER CONCERNING DOGS.

THEY approve dogs, such indeed as have large ears, and large bodies, black eyes, the nose of the same colour, blackish or reddish lips, and sharp teeth, large heads, wide breasts, long limbs, firm and thick arms[n], straight legs, but if not so, bending inwardly rather than outwardly; large feet, and such as in moving are dilated; toes with perfectly-formed joints, incurvated nails, a spine straight to the tail, and the tail thick, gradually diminishing from the upper part, having a very deep-toned voice, a white colour; and especially such as follow the flock; grey eyes, and a lion-like aspect, whether they have coarse or fine hair. They also make choice of such as have large jaws, and a large neck and throat. But you

[m] Cow's milk, in the original.

[n] Correspondent to the *os humeri* in the human frame.

you are to know that the word *neck* expresses all the circumference of the neck, and *auchen* is indeed, in human creatures, the posterior part of the neck, for man stands upright; and in animals it is the upper part of it, for animals bend downward. But when you hear the word *deire*, you are to understand the fore part of the neck, in the human race, but in animals the part of the neck underneath. They also approve the females that are distinguished by the marks already mentioned; having also, in addition, large udders, and teats proportionably large; for there are some which have them dry, and hard as a board, whether the body is covered with rough or fine hair: but a rough coat seems to carry with it a suitable degree of terror. Admission properly takes place at the beginning of the spring, that the offspring may be whelped about the summer solstice, for the female goes with young three months; and as soon as she has pupped, it is proper to throw away the degenerate whelps, or such as have some blemish. Out of seven indeed you ought to leave three or four; and out of three, you ought to leave two. They also litter them with straw, that they may have a soft bed, and that they may be kept warm; for this animal ill bears the cold. The pups are observed to look

up

up in twenty[b] days. But you ought to suffer them to be with their dams two months, and then to wean them. They also rub the pups with bitter almonds pounded with water, about the ears, and between the toes, that neither flies may pitch on them to hurt them, and that vermin may not torment them. They likewise encourage them to fight with each other, yet they do not suffer them to be worried, lest they become timid and cowardly, but that they may be patient under difficulties, and that they may not sink under them. They also use them to confinement, with a thong indeed at first, then with a chain, by degrees. But they do not suffer them to touch the carcasses of dead cattle, lest they be accustomed to them, and they attack them when alive; for they go on, and are difficult to be reclaimed, when they once eat their flesh when raw. You are also to rear your dogs with a view to consanguinity, for they naturally assist one another. But you ought (that wild beasts may not set on them,

[b] Pliny says, "The more plentifully they are fed with milk, "the later they see, but not beyond the twenty-first day, nor "before the seventh," viii. 40. Aristotle says, "The whelps "of those which go with young sixty-two days, are blind "twelve days: those which go three months have pups that "are blind seventeen days. *Hist. Anim.* vi. 20."

them, such as hyænæ and wolves), to protect their throats and necks, as with armour, with sharp nails, at the distance of two inches from each other. If you indeed wish a dog not to desert you, spread bread with butter, and give it him to eat[p], or measure[q] him with a green reed from head to tail. A dog will certainly follow you, if you tie the chorion[r] of the female, and bring it to him, that he may smell it.

III.—CONCERNING THE CURE OF DOGS.

You are to confine[s] mad dogs within, and you are to give them nothing to eat for one day: you are then to mix a little hellebore with their drink; and when they are purged, you are to feed them with barley-bread. You are likewise to cure persons bit by mad dogs in the same manner. You are also to destroy fleas with sea-water and brine, then anoint the dogs with cyprine-oil, with hellebore and water, and cumin, and the sour

grape,

[p] To lick, in the Greek.

[q] See Æli. N. A. ix. 54.

[r] The external membrane of the fœtus. Saserna prescribed a boiled frog for this purpose.

[s] The original implies, that the dogs were to be confined under ground.

grape, or the root of cucumber[t] with water. But it is better to anoint the body with amurca, for this will cure such as have the mange. Such things as have been prescribed with regard to sheep will destroy vermin, and cure other distempers of these animals, when they are more seriously infected.

IV.—CONCERNING HARES.

THE hare is indeed sometimes male and sometimes female, and it changes its natural powers; and it sometimes indeed propagates[u] as a male, and sometimes it produces young as a female.

V.—CONCERNING STAGS.

STAGS are afraid of an extended rope that[v] has feathers fixed in it, being frightened at the motion

[t] The wild cucumber is here meant.

[u] If a person that is curious wishes to see an account of this very extraordinary productive power of the male hare, he may consult a dissertation on this subject in *Raccolta d'Oposcoli Scientifici e Filologici*, tom. ii. Venet. 1729.

[v] There is, in modern times, a common method of keeping deer together by means of feathers fixed in lines; and the

motion of the feathers; but they have no notion of this fear, when they see men standing near them. When they indeed hear melodious pipes and reeds, they do not go away, but, being captivated by the sound, they stand still, and are thus taken. A stag breathing, or drawing its breath, confounds a serpent, and draws it to itself. If a person applies the burnt and powdered tail of a stag with wine to the parts of virility of an animal for admission, he makes him better prepared for the office; and oil being applied is an impediment to it: and this has the same effect with regard to human creatures.

VI.—CONCERNING SWINE.

THEY indeed approve sows that have a length and circumference of body, and such as are of a large mould, except the head and feet; for they that have small heads and short limbs are better, and they that are of one colour are more eligible than the variegated. They also select the boars in this manner, and in addition to the forementioned points: when they have the upper part

term used on the occasion by some keepers, is, I believe, called *showelling*. See Virgil. Georg. iii. 372. and Æneid, xii. 750.

part of the neck and the shoulders[w] large, and the mane thick; and we call the bristles that grow on the upper part of the neck by this name; and when they have plenty of what is called collops[x]; and we call collops what is generally termed brawny. This animal wants an abundant supply of water, and especially in the summer; and it ill bears the cold, and it is easily affected by it; for which reason they prepare styes for them, out of which they do not drive them in the winter before the frost has disappeared. But dealers that buy them, form their judgment of them from the bristles plucked from the mane; for when they see them bloody[y], they say that they are diseased; but when clean, the case is totally different. The best season certainly for admission is, from the blowing of Favonius to the vernal equinox, that the offspring may be farrowed about the summer solstice; for the animal goes with young four months. But when they have been impregnated, they separate the boars from them; for, by assailing and wounding them, they become

[w] Συνωμιαι are properly the joints of the shoulders.

[x] Κολλοψ. Eustathius and Pausanias said, this word signified the hard skin on the back, and on the upper part of the neck of oxen and swine.

[y] Pliny says the same thing; viii. 51.

the cause of abortion. One boar is sufficient for ten sows. The pigs that are farrowed in the winter forsake the teats, on account of the inclemency of the weather, and on account of their not having a sufficiency of milk, their dams driving them away, because their teats, being destitute of milk, are forcibly tortured and wounded by their teeth. When the sows have also farrowed, they leave the offspring with the dams during two months; they then separate them. They also cover the dam so, that indeed eight months of the year may be allotted to her breeding, and four months to the rearing of her offspring. You are also to confine each breeding-sow in her own stye, that the progeny of different dams may not be intermixed one with another, and that the progeny may be accustomed to their dams, and the dams to the pigs; for if they are intermixed one with another, it is impossible for the dams to know them. But it is better, if every sow rears her own pigs. This animal is chiefly fed with acorns. It is also fatted with wheat-bran, and with refuse from the threshing-floor, and with wheat. Barley also makes the animal get fat, and fit for breeding. Pigs are not infected with pestilential disease, or, when infected, they will be cured, if you throw the root

of

of asphodel into the water which they drink, or where they are frequently washed.

VII.—CONCERNING THE CURE OF SWINE.

SWINE will not be infected with disease, if you give them nine[z] river-crabs to eat. Diseased swine are known from the bristles plucked from the upper part of the neck; for if the bristles are indeed clean, they are healthy; but if bloody, or having a thick ichor[a] about them, they are diseased. Democritus, the physician, orders three minæ of the root of asphodel moderately pounded to be mixed with the food of each swine; and he says that it will be perfectly well before the seventh day. If they have a fever, you are to take blood out of the tail; and if they are diseased in the tonsils, you are to take blood from the shoulders. If they are indeed infected with an unknown disease, you are to confine them in the stye during a day and a night, and you are not to set before them food or or drink; but you are to put in water the pounded roots of wild cucumbers for a whole day and a night, and you are to give them this to drink the

 day

[z] Pliny recommends the same; xxxii. 6.

[a] Like an acrid fluid, which comes from wounds.

day following; for, after they have copiously drunk of it, they will, by vomiting, remove the cause of the disease. As this animal is much given to eating, it is very subject to pain[b] of the spleen; having therefore extinguished coals of the tamarisk in water, give it the animal to drink. Wine also poured on coals of the tamarisk instead of water, and drunk, will cure human patients; and Democritus bears undoubted testimony to this. This same Democritus affirms, that it will be a more efficacious[c] remedy to patients for the spleen, if, having heated iron red hot, you extinguish it in water, and you then mix the water with vinegar, and give it the splenetic patient to drink. When swine have indeed been stung by any reptiles, they will be cured by the remedies prescribed for the flock.

VIII.—CONCERNING WILD SWINE.

If you wish not to be hurt by them, carry the claws of a crab about you.

IX.

[b] *Splenalgia.* Pain of the spleen, or of the parts about the spleen.

[c] This is prescribed by Celsus; iv. 9.

IX.—CONCERNING THE SALTING OF ALL KINDS OF MEAT.

FLESH dressed[d] and dried, and put in shady and moist places, exposed to the north rather than to the south, keeps fresh for a very considerable time. Snow being put about it, and chaff being poured on, keeps it the sweeter; and you are not to give animals, whose flesh is to be salted, drink the[e] day before. But persons who salt meat ought to rid it of the bones; and parched salt is best adapted to the purpose: and the vessels in which the meat is to be salted, are better when they have had oil and vinegar in them. Goats flesh, and mutton, and venison, are best salted, if, after they have been first sprinkled with salt, the moisture and the animal juice are removed and wiped off, they are again sprinkled with salt, and are then laid among grape-stones not separated from the kernels, so that they[f] may not touch one another, but that the intermediate part may be well supplied with grape-stones: and if you pour sweet must on the meat, it will be much better.

[d] Cleaned, in the Greek.

[e] The day before they are killed.

[f] *i. e.* the pieces.

BOOK XX.

HYPOTHESIS.

These things are in this Book, being indeed the Twentieth, concerning the Select Precepts of Agriculture, and comprising the arrangement concerning the propagating of fish, and the bringing of them from different places into one spot, and concerning the taking of them, and the composition of all kinds of baits that are adapted to the taking of different river and sea fish.

I.—CONCERNING THE PROPAGATING OF FISH.

FISH-PONDS are to be made in an inland situation, the extent one wishes, and has the power to make them; and they are to be filled with fish that breed in river-water; or one may transfer fish[g] from the sea into river water: and persons who are near the sea or a lake, what kind of fish soever the part of the sea produces, stock their artificial pond with them. One is also to

[g] Mixed fish, in the original, which may refer to such fish as live in fresh as well as in salt water.

to adapt them to the nature of the place; and if it is indeed fenny, he is to put in fish that live in fenny situations; and if it is rocky, he is to put in those[h] that are bred in such situations. The tenderest herbage is also thrown in to feed them, and very small fish, and the gills and intestines of fish, and tender figs cut small, and soft cheese, to sea and to rock fish; and squillæ, and gudgeons, or any thing of this kind, one may be supplied with, or some coarse bread, or dry figs cut small. There will also be plenty of fish in any place, if you throw the herb polysporos, which greatly resembles polygonos, well shred, into the water in which fish are bred.

II.—TO BRING FISH TO ONE PLACE.

HAVING separately pounded, and then mixed with fine sand, and having laid them in the place an hour or two before, pulegium, thymbra[i], origanum, sampsuchum[k], three drams of each; the bark of libanotus, myrrh, sinopis, eight drams of

[h] Called by the Romans *pisces saxatiles*, because they lived near rocky shores.

[i] *Saturcia.*

[k] Sometimes called *amaracus*; Matth. iii. 40.

of each; half a mina of meal[l] of parched barley reduced to solution in well-flavoured wine; twenty-four drams of roasted hog's liver, an equal quantity of goat-suet, and as much garlic; set your nets. But some throw in the herb delphinium[m], pounded and sifted, and allure the fish, that they may take them with their hands. Some make up, with mould and bran, half a mina of garlic, or an equal quantity of sesamum, pulegium, origanum, thyme, sampsuchum, thymbra, staphisagria, thirty-two drams of each, sprinkling on them a mina of meal of parched barley, an equal quantity of alica[n], sixteen drams of libanotus; and they throw them in.

III.—TO TAKE RIVER-FISH.

Pound mutton suet, parched sesamum, garlic with well-flavoured wine, thyme, dried sampsuchum, an equal quantity of each, and make them up with bread, and throw them in.

IV.

[l] Αλφιτον.

[m] Consult Matth. lib. iii. c. 70. The original says, the male herb delphinium.

[n] Χονδρος. Pliny prescribes a method of making alica with spelt; lib. xviii. c. 11.

IV.—TO BRING ALL KINDS OF FISH INTO ONE PLACE.

POUND separately and together the blood of oxen, goats, sheep, swine, and the fæces out of the small[o] intestines, thyme, origanum, pulegium, thymbra, sampsuchum, garlic, the lees of wine of a good flavour, an equal quantity of each, and of the suet of the same animals; and when you have made them into masses, throw them into the places an hour before, then[p] cast your net.

V.—FOR TAKING ALL KINDS OF FISH.

HAVING mixed together the blood of a black she-goat, the lees of wine of a good flavour, and a due quantity of meal of parched barley, and having made it up with the lungs of the goat cut small, use it. But if you sprinkle salt on the fishing line, a person will not take a fish.

VI.

[o] These, in the human body, are *duodenum, jejunum, et ileum.*

[p] "Then cast your net round them," in the Greek.

VI.—CONCERNING THE CATCHING OF FISH.

I WISHED indeed, most[q] honoured Sir, to explain to you the nature of fish, as I may use the expression, and their mode of life, and the breeding and the rearing of them, and the length of their life, and which of them belong to the sea, and which to rivers and to lakes; then to specify which of them are squamous, and which are prickly, and which are smooth; and[r] which have delicate shells; and which are viviparous, and which are oviparous; and which of them are solitary; and which of them devour one another; and which do not at all come near one another. So far did I wish to proceed with active fortitude, that none of the inhabitants of the main might pass unnoted; but we will indeed treat of these in due time: and now, as I perceive some persons ardently desire a dissertation on this subject, and they apply for it in good earnest, I will without hesitation satisfy their expectations on each head, in common, and at the same time, in proper terms, as the subject necessarily requires; and I will throw some light on the different parts of it, from

[q] Supposed to be Constantine.

[r] Μαλακοστρακοις; Athenæus, p. 106. Aristotle *de Generatione Animal.* i. 14. *et de Part. Animal.* ii. 17.

from the documents, which Asclepius[s], and Manetho, and Paxamus, and Democritus, have transmitted to us.

VII.—BAITS FOR FISH.

FOR mullets, the pastinaca[t], scorpii[u], elopes, phagri[v], chalkeis[w], scari[x], glauci[y], surmullets, amiæ[z], raphides[a], kallicthues, thynni[b], trachuri[c], sacuti[d], melanuri, smarides[e], capitones[f], polypodes,

[s] This has been supposed to be an abbreviation of Asclepiodotus.

[t] *Sting ray*; in Greek, τρυγων:

[u] The father Lasher is now called σκορπιος.

[v] Called *pagri*, in Vitelli's translation.

[w] *Fabri* of the Romans.

[x] See Pliny, lib. ix. c. 17.

[y] The blue shark is now called *glaucus*.

[z] Translated *amiari* by Vitelli.

[a] *Raphydi*, in Vitelli.

[b] The tunny is called *thynnus*. Pennant, class iv. 133. Matth. ii. 30.

[c] The same in Vitelli.

[d] *Sacutori et melanuri*, in Vitelli,

[e] Matth. l. ii. c. 27.

[f] Pennant, class iv. 175.

podes[g], vulpeculæ[h], boves[i], musculi[k], mormyri[l], smyli[m], sepiæ[n], phokides[o], locustæ[p], the torpedo[q], inlides[r], allabetes[s], sargi, karides, charaki[t], buglossi[u], auratæ[v], aleantrides[w], alosæ[x], illi[y], amiæ,

[g] *Polipodi*, in Vitelli.

[h] Long-tailed shark; Pennant, class iv. 44.

[i] The sharp-nosed ray was called *bos*; Pennant, iv. 31.

[k] The whale is called *musculus* by Pliny, lib. xi. c. 37. Pennant, class iv. 16.

[l] *Mormirori*, in Vitelli.

[m] In some manuscripts, the word is written σμυρων.

[n] The cuttle-fish was called *sepia*; Pennant, vi. 17. Matth. ii. 20.

[o] *Pholidi*, in Vitelli.

[p] *Locustæ marinæ*. Καραβων.

[q] Electric ray; Pennant, iv. 36.

[r] *Julidi*, in Vitelli.

[s] *Alabetori*, *sargi*, *squilli*, in Vitelli.

[t] *Cariaciori*, in Vitelli.

[u] Βυγλοσσος is the Greek name of the sole; Pennant, iv. 107.

[v] Χρυσοφρυς is, in English, called *gilt head*; Pennant, iv. 112.

[w] *Aleantride*, in Vitelli.

[x] Shad's Pennant, iv. 104.

[y] Ιλλων, ανιων, *illori sacri pesci*, in Vitelli. Needham wishes to change ανιων into αιθιων. It ought to be αμιων.

cordylæ[z]; for small sea-fish, as gudgeons, asclli[a], daci[b], porci[c], the mustela[d], the lepidotus[e], orphus, leucopis, murænæ, coracini[f], curabi, anguillæ[g], buccina[h], latili, purpuræ[i], lupi; and for all kinds in every season, and for small fish. The[k] first bait is for large fish; as for julides, glauci, phagri, and likewise for all large fish; for this bait as soon as it is set on the hook, and touches the water, the small, fearing the arrival of the large fish withdraw, and the large fish, tempted by the natural sweetness of the bait, come out of their haunts, although they may be two

[z] Σκορδυλων, in the Greek. *Cordylari*, in Vitelli.

[a] Γναριδων. The same in Vitelli.

[b] The same in Vitelli.

[c] The same in Vitelli.

[d] The bearded cod. Pennant, iv. 87.

[e] *Lepiduti, orphi, leucopidi, murene*, in Vitelli.

[f] The same in Vitelli.

[g] Eels.

[h] Κηρυκων.

[i] More than one species in the Italian seas. Pennant, vi. 74.

[k] The first that is prescribed. It is possible the author may mean the bait recommended in the next section. It is to be wished this chapter had come down with fewer indications of imperfection.

two stadia[l] distant, and from a natural propensity they play and contend with each other, and being attracted with pleasure, they neither struggle nor run away with the fishing-line.

VIII.—COMPOSITION OF BAIT.

Of the silurus[m] and of oats, eight drams; of[n] the down of thistle, of anise, of cheese made of goats milk, four drams of each; two drams of opoponax[o]; four drams of the blood of a hog; four drams of galbanum: pound them carefully apart; and having mixed them together, pour some genuine rough wine on them; and having made them into collyria[p], as you do suffumigations, dry them in the shade.

IX.

[l] The Greek ϛαδιος consisted of a hundred English paces, 4 ft. 4. 5 inches.

[m] Matth. l. ii. c. 26.

[n] Of the flying down, of light colour, in the Greek.

[o] Sometimes called *heracleum*; Matth. iii. 50.

[p] The *collyria* of the Greeks were so called from their form. They had their ξηροκολλυρια and υγροκολλυρια.

IX. — ANOTHER COMPOSITION FOR LARGE CORACINI ONLY, AN EXCELLENT BAIT.

EIGHT scruples of parched lentils, a dram of parched cumin, of sour grapes and raw mullet four drams, four drams of coronopodium[q], a dram of bitter, that is, of crude anthyalia,[r] four drams of dried date, a dram of castor[s]: having pounded them all quite fine, make them up with the juice of anethum[t]; and having made them into collyria, use them.

X.—FOR RIVER-FISH, WHICH OPPIAN USED.

HAVING cut some veal into very small pieces, put it in a pot[u] with the calf's blood, and let it remain during ten days, and then use it for bait.

XI.—BAIT TO WHICH FISH PROMPTLY COME.

MAKE up some meal of parched barley, and throw in the pellets that are made of it.

XII.

[q] Pliny, xxi. 16. [r] Called *anthyllis*, Matth. l. iii. c. 136.

[s] Matth. l. ii. c. 23.

[t] Dill, or anet.

[u] The original implies it was a cup of Lacedemonian make.

XII.—FOR SMALL RIVER-FISH.

Having mixed two minæ of the bran of barley, and a chœnix of whole lentils, macerate them in a sufficient quantity of unadulterated garum*, and add a chœnix of sesamum, and scatter a little of this, and throw it about in the water; for as soon as you have dispersed it, all the small fish will come to it, although they may be five stadia distant, they will come to the same spot: but the large fish will fly away from the smell. Use it then in this manner, and it will ensure success.

XIII.—FOR THE FISH CALLED PORCI.

Having pounded four drams of sesamum, two drams of cloves of garlic, two drams of the flesh of the quail, well seasoned, a dram of opoponax, make them up with strigmentum*; and having formed them into collyria, use them.

XIV.

* See chap. 46.

* In Greek γλοιος, which meant the sordes scraped from the skin in the *gymnasia*, or places of exercise. The Greek word sometimes means the sordes of oil.

XIV.—FOR EELS.

Take eight drams of the sea scolopendra, eight drams of river[x] squillæ, one dram of sesamum, and use them.

XV.—BAIT FOR SEA[y] MULLETS.

Pound and mix all together a small quantity of malabathrum[z], ten grains of pepper, three grains of melanthum, the flowers of the sweet rush, and some put in a little of the inside, then macerate the crumbs of fine bread in a cotyla of Mareotic[a] wine, and take them up when dry, and having[b] made them up, use them for bait.

[x] It appears from this passage that there were river as well as sea squillæ.

[y] The mullet is reckoned among the *pisces littorales*; the species mentioned here probably lived more towards the main sea.

[z] By way of eminence called *folium*. The tembul of Avicenna; Matth. i. 11.

[a] The vines which produced this, are mentioned by Virgil, G. ii. 91.

[b] United, is the Greek expression.

XVI.—ANOTHER EXCELLENT BAIT, AND FIT FOR NO OTHER BUT FOT THE BEST MULLETS.

HAVING pounded four drams of the liver of the tunny, eight drams of sea squillæ, four drams of sesamum, eight drams of bean-flour, two drams of crude amiæ[c], mix them with sapa; and having made them into collyria, use them for bait.

XVII.—BAIT FOR SEA MULLETS.

PUT the member[d] of a ram into a new pot, and having covered it with another pot, stop it so that it may have no vent, and send it to the glass furnace to be set on from the morning to the evening, and you will find it become[e] quite tender; then use it for bait.

XVIII.—A CONVENIENT PREPARATION, THAT THE FISH MAY COME TO THE SAME SPOT.

TAKE three patellæ,[f] that are produced on rocks, and having taken out the fish, inscribe on the

[c] Mentioned in c. 7.

[d] To μοριον.

[e] Tender as cheese, in the Greek.

[f] See Aristotle, Hist. An. lib. iv. c. 4; and Athenæus, lib. iii. p. 85. The English name is *limpet*, in Greek λεπας.

the shell the words which follow, and you will immediately see the fish come to the same place, in a surprising manner. The words are, *the God of Armies*, and the fishermen make use of them.

XIX.—BAIT FOR SURMULLETS AND LARGE SCARI, THAT THEY MAY BE ATTRACTED BY IT, TO WHICH NONE OF THE SMALL FISH MAKE THEIR APPROACH, ON ACCOUNT OF THE UNSAVOURINESS OF THE BAIT. BUT THE COMPOSITION IS NATURALLY OF AN ATTRACTIVE QUALITY.

Having well pounded eight drams of the flesh of the river fish typhlinus[g], eight drams of parched lentils, four drams of river squillæ, one dram of malabathrum, make them up with the white of an egg, and having made them into collyria, use them.

XX.—FOR ALL LARGE SEA-FISH, AS GLAUCI, ORPHI, AND FISH OF THIS KIND.

The testes of a cock, with cones of the pine, both being parched and pounded, eight drams indeed

[g] Said, on the authority of Hesychius, to be an inhabitant of the Nile.

indeed of the former, and sixteen drams of the cones of the pine, are pounded as fine as flour; and they are made up as collyria, and they are set as bait for the fish.

XXI.—FOR MURÆNÆ.

HAVING pounded sixteen drams of the river silurus, eight drams of the seed of wild rue, eight drams of veal suet, sixteen drams of sesamum, and having made them into collyria, use them.

XXII.—FOR POLYPODES[h] AND SEPIÆ.

WELL pound and make into collyria, sixteen drams of sal ammoniac, eight drams of butter made from goats milk, and rub the ropes, or sails that are not hemmed, with them, for then the fish will feed round them, and they will not go away; and do you draw up and pour into the boat the locustæ, murices, porphuræ, and whatever fish there are.

XXIII.—FOR OTHER KINDS OF FISH.

MIX eight drams of sal ammoniac, a dram of onion, six drams of veal suet; make the hooks of

[h] In Latin *polypi*, inhabitants of the Adriatic. See Lemery, *Traité des Drogues*; and Matth. ii. 20.

of a sea-green colour, and having rubbed them with the preparation, use them; and the fish will spontaneously come, being attracted by the smell, and they will thus be taken.

XXIV.—BAIT FOR ALL FISH IN EVERY SEASON.

TAKE four drams of the leaves of Celtic nard, one dram of cyperus, a small quantity of Egyptian smyrnium[1], as much cumin as you can hold between three fingers, a handful of the seed of anethum; having pounded and sifted them, pour them into a reed; and taking worms or similar productions, wash them, and put them in a vessel, and press out the moisture of agrostis[k] on the spot, and mix a sufficient quantity of the composition, and putting the worms into the mass, bruise them, and then lay your bait.

XXV.—FOR SMALL FISH.

A CHŒNIX of river squillæ is macerated in the genuine brine of salted coracini, and is seasoned during two days; on the third day lay your bait;

[1] *Olusatrum* in Latin; Matth. lib. iii. c. 65.

[k] The text is here rather embarrassed.

bait: and fish with two reeds[l], having four hooks each; and having an assistant with you, you will take such a quantity, that you will not be outdone by the cast net, nor by the other common net of the fishermen.

XXVI.—UNIVERSAL BAITS.

HAVING well pounded and mixed lentils with dry amylum, make use of them.

XXVII.—FOR ALL SMALL FISH.

TAKE the flesh[m] of snails, without the tails, and bait with them, not using too great a quantity.

XXVIII.—CONCERNING WEELS.

THE dregs of myrobalanum[n], human fæces, fine bread, pound each by itself, and mix the three ingredients, and put them into the weel, and use them, and they will be efficacious.

XXIX.—ANOTHER CONCERNING WEELS.

A BAIT which fishermen make use of, as I have found it prescribed. Take the shells that are

[l] Δυσι καλαμοις.

[m] Την σαρκα.

[n] *Glans unguentaria* of the Romans, Matth. iv. 154.

are called *pomatia*[o], that grow on rocks, and the insides of them, and fish with them.

XXX.—FOR SEA MULLETS.

Mix a dram of the shell of the sepia with green sisymbrium, and with water, and with fine flour, and with cheese made from cows milk, and make use of it.

XXXI.—FOR SCORPII ONLY.

Eight drams of saw-dust of the sycamore, and of the stem of the artichoke, and of sandarach[p], with five caterpillars, that are found on cabbages, and wheat well pounded; having mixed them with sand, and poured water on them, make them into pellets, and bait with them.

XXXII.—FOR SEA PHAGRI.

Mix a decoction of melanthium with locustæ and round worms, and with wheat flour; then

[o] Thus called from their *operculum*. Pennant, vi. 128.

[p] The *sandarach* of the Greeks was a kind of arsenic, called by the Romans *auripigmentum*. The Arabs called the gum which flowed from the juniper, by this name. Matth. v. 81.

pour on some water, and having made them of the consistence of honey, bait with them.

XXXIII.—FOR RAPHIDES[q] ONLY.

MAKE up the gall of a calf with the meal of parched barley, and oil, and water, into pellets, and bait with it; and having masticated it, spit it into the water, and the fish will make their approach.

XXXIV.—FOR TUNNIES ONLY.

HAVING burnt walnuts to ashes, and having pounded them quite fine with sampsuchum, and with fine bread macerated in water, and with goats cheese, and having made them into pellets, make use of them.

XXXV.—FOR SMARIDES.

HAVING pounded garlic with bread, and with cheese made of goats and cows milk, and with fine flour, and having made it into balls, bait with it.

[q] The Latin name of this species is *acus*; in English, the pipe fish.

XXXVI.—FOR THE RAY.

HAVING soaked pigeons dung with the finest[r] flour, make it up.

XXXVII.—ANOTHER FOR THE SAME PURPOSE.

HAVING boiled lettuce-seed, and having poured butter and the finest flour on it, make it up.

XXXVIII.—FOR SALPÆ[s].

HAVING boiled green moss from a rock with oil, bait with it.

XXXIX.—FOR GLAUCI.

HAVING broiled and boned the fish called *amiæ*, *callichthues*, and *shads*, and having added to them moss and coarse[t] barley-meal, and having made them into balls, bait with them.

XL.—FOR TRACHURI.

HAVING macerated asinine[u] fæces in the juice of coriander, and having made them into balls with fine flour, bait with them.

[r] In Greek σεμιδαλις; in Latin, *similago*.

[s] See Pliny, lib. ix. c. 18.

[t] Κριμνον, in Greek.

[u] The authenticity of the Greek word has been questioned.

XLI.—FOR MULLETS, &c.

HAVING mixed together bread made of fine flour and goats cheese, and asbestos[v], pound them, and pour sea-water on them; and making them into balls, bait with them.

XLII.—FOR POLYPODES.

HAVING tied some small mormyri[w] round a strong line, you are to bait with them.

XLIII.—FOR SEPIÆ ONLY.

HAVING pounded lees of wine with oil without water, and proceeding to the place, throw them into the sea; and seeing that the lees descend, they will emit the cuttle-liquid[x], and they will come to the place in which the oil has appeared; and so take them.

XLIV.—FOR LOCUSTÆ.

HAVING securely tied a mormyrus, pound ten porphyræ with oil, and scatter a little moss on the rock, and you will take them.

XLV.

[v] Amianthus and quicklime has each this name.

[w] Pliny, ix. 23.

[x] See Pliny, ix. 29.

XLV.—FOR MELANURI.

TAKE a goat's liver, and bait your hooks with it. We have also found another bait for sea prey, and for many other fish, the hoof[y] of a goat or of an ass.

XLVI.—COMPOSITION OF GARUM.

WHAT is called *liquamen* is thus made: the intestines of fish are thrown into a vessel, and are salted; and small fish, especially atherinæ[z], or small mullets, or mænæ[a], or lycostomi[b], or any small fish, are all salted in the same manner; and they are seasoned in the sun, and frequently turned; and when they have been seasoned in the heat, the garum[c] is thus taken from them. A small basket of close texture is laid in the vessel filled with the small fish already mentioned, and the garum will flow into the basket; and they take up

[y] In the original thus expressed: "Use as bait the hoof of "a goat or of an ass."

[z] Atherine in Vitelli.

[a] Described by Matthiolus, lib. ii. c. 28.

[b] Called by Aristotle and Ælianus καλλιωνυμοι; Arist. H. A. lib. viii. c. 13. Ælian. H. A. lib. xiii. c. 4.

[c] See Pliny, xxxi. 7.

up what has been percolated through the basket, which is called *liquamen*[d]; and the remainder of the feculence is made into alec[e]. But the Bithynians prepare it in this manner: they indeed take small, or large mænæ, which are more eligible; but if they cannot get them, lycostomi or sauri[f], or scombri[g], or alec, and a mixture of all; and they throw them into a baking-trough, in which they have been used to mix their meal; and having applied two Italian sextarii of salt to a modius[h] of the fish, they work them, that they may be mixed with the salt; and having suffered them to lie during one night, they put them into an earthen vessel; and they set this in the sun during two or three months, stirring them with a stick at stated periods; they then take and stop them and lay them by. Some indeed pour two sextarii of old wine on a sextarius of fish. But if you wish to use the garum immediately, that is, not to insolate it, but to boil it, you are to do it in this manner: take some strong brine that is proved,

[d] See Isidor. Orig. xx. 3.

[e] Pliny mentions how it was made, &c. in the chapter already cited.

[f] Called by the Romans *lacerti*.

[g] Mackarel.

[h] One peck 7.68 sol. inches in English corn measure.

proved, so that an egg being put into it may swim (but if it sinks, it has not a sufficient quantity of salt); then throw the fish into the brine, in a new pot, and adding some origanum, set it over a good fire, until it boils, that is, until it begins to be a little diminished (some also add sapa to it); then when it is cool, pour it into a strainer a second and a third time, until it comes out clear; and having stopped it, lay it by. But the best garum, which is called *aimation*[i], is thus made: the intestines of the tunny, with the gills, and the ichor[k], and the blood, are taken, and they are sprinkled with a sufficient quantity of salt; and they are left in the vessel during two months in general; the vessel being then tapped, the garum called *aimation* is drawn[l].

[i] The Lacedemonians had what the Romans called *jus nigrum*, which was termed αιματια, from which it is possible this composition derived its name.

[k] Watery humour like serum.

[l] Comes out, is the Greek expression.

THE END.

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